Industrial Finishing

Reg. U. S. Pat. Off.

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LACQUER SEALER

Applied over filler and stain sands easily within 30 minutes. No rolling up under sandpaper. Easy flowing, it eliminates bridging, pinholing and all orange-peeling.

NO PRECIPITATION OF INERT PIGMENT IN SPRAY TANK

DHRLAK - R

RUBBED EFFECT CLEAR LACQUER

Gives a real rubbed effect job without any touching-up. It shows absolutely no over-spray in production, shows no orange-peel, pinholes, check, crack, nor graying of film on standing.

If settling dirt makes rubbing necessary it will stay rubbed and not show polish.

Accelerated weather tests show this finish stands approximately 70 years without breaking down.

"Send for DHRLAK Finishes Today"

Denny, Hilborn & Rosenbach, Inc.

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From the Editor's Window

MORE manufacturing concerns are directing attention to their finishing departments, with the idea of obtaining volume production and high-quality workmanship at a minimum expenditure of time, floor space and labor. Specific information on how to accomplish this objective is incorporated in illustrated feature articles in this issue of INDUSTRIAL FINISHING; for example "Finishing Novelty and Juvenile Furniture" (page 24) by our editorial representative, Mr. P. C. Bardin, and "Finishing Metal Beds on a Conveyor Line" (page 67) by Mr. R. S. Logan, Vice President of the Logan Co. Significant suggestions also appear in other articles and in several of the advertising pages.

Really, what equipment to install, where to place it to form an economical production line, how to adapt it effectively to certain kinds of products, and why it operates so satisfactorily when properly manned and supervised—this information is of vital concern to industrial management today.

Sensing the interest along these lines, INDUSTRIAL FINISHING is now presenting, every month, feature articles which describe and illustrate successful installations of the latest production and conveying equipment in service in the finishing departments of various types of modern manufacturing plants. This will make INDUSTRIAL FINISHING doubly valuable to everyone interested in modern finishing methods.

O. H. Rohr

Managing Editor

- Bright Colors -

A new line of bright transparent colors for use on Oak Breakfast Room suites, Porch Furniture, Swings and Novelties.

Panels showing these colors and finishes are available.

THE SCHAEFER COMPANY

Manufacturers of Lacquer and Varnish

1315 W. Kentucky St. Louisville, Kentucky

Precautions Against Fire

Practical recommendations and suggestions about making and keeping the spray finishing department reasonably safe from fire hazard; these precautions will afford remarkably effective protection in any factory

By M. V. Leach

SPRAY BOOTHS of all metal construction, automatic sprinkler systems overhead and chemical fire extinguishers that can be easily reached—these are splendid measures against fire in the finishing room. Regular cleaning of the spray booths to prevent an accumulation of combustible waste material, general orderliness and cleanliness, self-closing lids on all material containers—these are small precautions, but they are worthwhile.

A sand and soda box, with buckets filled with this material, should be located in an accessible place, a short distance from each spray booth; this will be very valuable in time of emergency. Anyone can throw this material on the flames, and it helps to smother out most any kind of a fire by excluding air.

Spray operators should be required to make themselves familiar with the operation and location of every fire extinguisher in the finishing department. Bronze or brass scrapers should be provided for cleaning spray booths. Steel scrapers may make a spark when they strike iron bolts in the booths—and said spark may start things a poppin'.

The day's surplus supply of inflammable material should be placed in a portable fireproof cabinet and removed to a fireproof shed every night. Such a shed, located a safe distance from the main building, relieves the finishing department of a great fire hazard.

Motors; Lights; Matches

Since compressed air must always be on hand, why not use an air-driven motor for running the spray booth exhaust fans? Many industrial establishments use air-driven drills, reamers and various other tools. No motor! No switch! No sparks! Lifting the gun from its hook could start the motor so that ventilation would begin before the spraying starts. Replacing the gun on its hook could stop the fan and thereby conserve air.

Also, if vapor-proof lights were used and switches for these were placed a safe distance from the booths, and if the wiring conformed to the rules and regulations of the fire underwriters—less fire hazard.

Everyone should be prohibited from carrying matches into any room where spray finishing is going on. A match may find its way to the floor and be run over by a truck, unnoticed by anyone until a blaze starts.

Fire departments in the locality of factories that use lacquer should be given special instructions as to how to fight these fires. The factory management

should see to it that the firemen are provided with special equipment such as gas masks, flash lights, etc., so as to be able to cope with the strangling smoke arising from a lacquer fire.

All used wiping and cleaning rags should be kept in a metal container and removed every night. Rags clean enough to be used again should be spread out so air may circulate freely through them, to prevent the possibility of spontaneous combustion or the starting of a "mystery" fire.

Finishing Sharp Corners

In finishing sharp corners with a spray gun, consider the fact that you are shooting against a very limited surface where as much material may blow off as blows on. When finishing edges and corners with lacquer, it is well to hold the gun a little farther away and use less pressure on the trigger for the first coat, until you gently deposit a little material in semi-wet condition; then the next coat will stay where it lights, taking hold of the first coat. A good practice is to *shoot to the corner* instead of directly at it.

When polishing the surface, these sharp corners should be carefully avoided with polishing pads, polish, etc. They need be only touched with a clean-up cloth, for generally there is nothing on them to require an abrasive. This applies in the case of practically all finishing materials.

Stains, filler, etc., brushed on with a bristle brush, are generally applied with a very light touch at the corners and a neat clean-up on the adjoining flat surfaces, with particular care being taken that the bristles of the brush do not over-ride the corners. For instance, on a table leg or desk leg it is better to use a narrow brush than one so wide as to overlap the corners and drag off the material already applied.

In wiping up fillers, care must be used so that the wiping rag does not over-ride corners, for in spite of the lightness of touch, there is not enough surface there to resist the slightest pressure; also, uneven pressure will be exerted on the edge unconsciously on the part of the workman, and the small amount of material a sharp corner will hold, will wear through. Hence, fight clear of all sharp corners in filling, wiping up, polishing, etc.—L. M. V.

Zapon of California Moves Office

It is announced that the general office of the Zapon Co., of California has been moved from 1721 Poplar St., Oakland, Calif., to 1317 So. Olive St., Los Angeles.

James B. Day & Co. Convention

Salesmen of James B. Day & Co., gathered at the Chicago plant for their summer convention June 21st and 22nd. A feature of the convention was a demonstration by Mr. Jack Albl, service manager, of the company's new One-Coat Utility Lacquer. The convention was followed by a banquet at the Ridgemoor Country Club for the salesmen and officials.

"Specifications for Aircraft Finishing"

The Aviation Division of Berry Brothers, Inc., 211 Leib Ave., Detroit, Mich., announces that the 4th edition of "Specifications for Aircraft Finishing" is now in print. According to the announcement:

"The latest, most complete and up-to-date technical information on the art of aircraft finishing is compiled in this booklet, which is now available to all persons in the aircraft industry. Copies are also available for technical students enrolled in the flying schools and universities. There is no charge for this service."

"I have promised myself so many times to prepare something from my experience that would be suitable for INDUSTRIAL FINISHING, *and have been interferred with so much, that I have just sat down and written up the accompanying short article on 'Finishing Costs.'*

"The experience on which this short article is based is from a large manufacturer of dining room furniture in Pennsylvania, in the execution of our contract in which we made some remarkable savings in their finishing dept."—

C. F. Scribner

FINISHING COSTS

Chief Engineer of Bradner-Scribner Engineering Co.* calls attention to the need of an incentive pay system for finishers, and gives some detailed production costs on furniture finishing

By C. F. Scribner, M. E.

PROVIDING an incentive for employes of the finishing department that will induce them to put forth their best efforts and turn out a maximum volume of good work, is not the simple matter that it may seem.

Too often insufficient consideration is given to the fact that to get men to do more, they must be given the opportunity to earn more.

In one plant where the writer was engaged, production standards were set for all finishing operations. These standards were expressed in *man-hours* for both operator and helper, instead of the usual dollars and cents piece rates.

The table marked "Fig. 1," shows such standards applied to the finishing operations on a certain buffet and its accompanying rail, finished in either varnish or lacquer.

In Fig. 2, similar standards are shown as applying to a certain number of china closets, including the shelves.

This method of setting produc-

*3042 Archer Ave., Chicago.

No. 1000 Buffet	BUFFET							
	Base				Rail			
	Varnish		Lacquer		Varnish		Lacquer	
	Operator	Helper	Operator	Helper	Operator	Helper	Operator	Helper
Stain and Fill	.476	....	.476	....	.047	....	.047	....
Touch-up & Putty	.267	....	.267	....	.022	....	.022	....
Hi-Lite & Shellac.	.400	....	.400	....	.030	....	.030	....
Sand after Shellac	.134	....	.134	....	.011	....	.011	....
1st Coat	.060	.043	.120	.086	.010	....	.020	....
Sand after 1st Coat	.111	....	.111	....	.011	....	.011	....
Finish Coat	.050	.036	.100	.072	.010	....	.020	....

Fig. 1—Standards (in man-hours) applied to finishing operations on a certain buffet.

No. 1000 China	CHINA CLOSET							
	Case				Shelves			
	Varnish		Lacquer		Varnish		Lacquer	
	Operator	Helper	Operator	Helper	Operator	Helper	Operator	Helper
Stain & Fill.....	.430	....	.430	....	.858	....	.858	....
Touch-up & Putty	.267	....	.267	....	....	....	....	....
Hi-Lite & Shellac.	.400	....	.400	....	.500	.500	....	....
Sand after Shellac.	.133	....	.133	....	.445	....	.445	....
1st Coat	.060	.043	.120	.086	....	....	....	....
Sand after 1st Coat	.111	....	.111	....	....	....	....	....
Finsh Coat	.050	.032	.100	.064	.500	.500	.750	.750

Fig. 2—Standards (in man-hours) applied to finishing operations on a certain china closet.

tion standards as well as the actual figures applying in these two cases, will be of interest to INDUSTRIAL FINISHING readers.

Heavy Shellac Coat Caused Trouble

The well-meaning employe who becomes too eager to produce a fine job will sometimes cause a great deal of unnecessary trouble and delay. At one time we were putting through a nice lot of walnut cabinets and, as a pure orange shellac was being used at that time, the spray man was instructed to apply a light wash coat —2-lbs. of gum to the gallon of alcohol—before proceeding with the varnish coats. However he conceived the idea of finishing a few cabinets extra nice and, to obtain an unusual amount of depth and finish body, he used a 4-lb. cut (4-lbs. of shellac gum to the gallon of alcohol) and laid it on real thick. Over this heavily shellaced surface, one application of rubbing varnish was laid.

Later, my attention was called to the fact that the varnish was scaling; when tapped gently with a penknife or similar object, it would fly off in little flakes down to the wood. Our varnish, being of a quality beyond dispute, we investigated farther down and found that the heavy shellac had formed a hard brittle film which the rubbing varnish did not penetrate and to which naturally it could not adhere.

This fellow, with seemingly good intentions, had caused these cases to be sent back to the patcher man who was obliged to remove the glassy-like surface so the cabinets could be started all over again.

Spraying finish requires particular care, as there are many ways in which an article or job can be made intolerable or spoiled. Then, as we refer to the modern finishes of today where the color shading and tone are nearly all produced at the spray booth, much depends, I think, on the final beauty, artistic appearance, and general salability of a finished product.—J. W. McFadden.

Denny, Hilborn & Rosenbach's New Location

Denny, Hilborn & Rosenbach, Inc., announces:

"Our new Chicago warehouse and offices are located at 1755 Armitage Ave. where a larger and more complete stock of materials will be carried."

DuPont Sales Contest

The New England branch of the Paint and Varnish Division E. I. DuPont de Nemours & Co., with headquarters at Everett, Mass., was the winner of "Challenge Month" (an inter-office sales contest), securing the largest percent of increase in trade sales during the month of May over May 1928. The West Coast branch office was second followed by the Philadelphia and Chicago offices.

Costs you nothing..

to check up on the 14 claims of Zapon Sanding Sealer No. 1038

ZAPON Sanding Sealer No. 1038—although pricedconsiderably lower than a good grade of shellac is not a substitute for it. It is a high grade pyroxylin lacquer sealer, which we have developed for manufacturers who want a sealer which will fill the pores, dry in ⅓ the time of shellac and sand easier than shellac. Not only will Zapon Sanding Sealer No. 1038 give you the results that you have been getting with expensive shellac, but you will be able to accomplish more at a smaller cost.

One spray coat of Sanding Sealer No. 1038 will fill the pores and has body enough to seal free from pin holes and level perfectly, (experienced manufacturers realize this necessity). It will not bleed stains or bleach fillers.

You will like the free flowing quality and the remarkable freedom from orange peel in the finish that Sanding Sealer No. 1038 produces. You will like the way this Sealer works as it builds rapidly and dries quickly.

The finish produced by this Sealer will satisfy you. It is clear, transparent and absolutely free from any grayish cast.

The 14 Claims of
ZAPON SANDING SEALER No. 1038

1. Costs less than good shellac.
2. Cuts sanding costs in half.
3. Dries in ⅓ the time of shellac.
4. Fills perfectly—one coat.
5. Seals perfectly.
6. Will not bleach fillers.
7. Absolutely free from grayish cast.
8. Easier to spray than shellac.
9. The best base for lacquer.
10. The best base for varnish.
11. Water-proof.
12. No Benzol or Wood Alcohol.
13. Adheres firmly—*try to tear it off!*
14. Crystal clear.

Like all lacquers it is water-proof. As a first coater it furnishes adhesion for lacquers which shellac fails to do. Manufacturers have found it an ideal first coater for use under varnish.

Many farsighted and famed makers of furniture have tested Zapon Sanding Sealer No. 1038 and are buying it today. Several manufacturers are saving as high as 25% on their sealing costs, and one of them cut sanding production costs 40%.

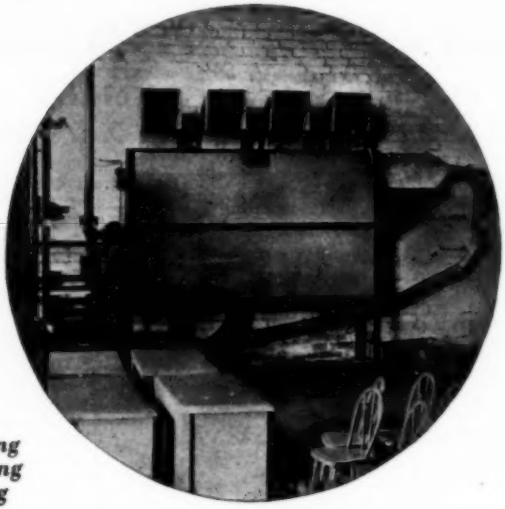
We want you to test this product. We want you to buy it; that is why we offer you a generous sample free to make your tests against our claims. Compare costs and check it on every point which you consider a standard for a good sealer. One of the world's largest Bentwood Furniture makers—quickly adopts Zapon Sanding Sealer No. 1038 after making a test.

It is our keen desire to permit us to send you this generous sample and let you discover for yourself how easy it is to cut down your costs. We know that if you try out Zapon Sanding Sealer No. 1038 you will become a regular user of it.

Fill in the coupon and attach it to your letterhead.

THE ZAPON CO., Stamford, Conn.
Gentlemen: Please send free sample of Zapon Sanding Sealer No. 1038 and prices. I. F. 7ly.

Name .....
Street .....
City .....
State .....
Firm Name .....



Finishing
Handling
Packing

NOVELTY AND JUVENILE FURNITURE

The work-in-process methods and modern equipment employed in the finishing department of the Lehman Co. of America include many interesting features which have been developed to serve certain very particular manufacturing requirements

By P. C. Bardin

IT ALWAYS looks like Christmas in the plant of the Lehman Co. of America at Cannelton, Ind. Bright colors and novel designs in nursery, juvenile and doll furniture for the kiddies, and the particularly convenient and comfortable "Bow Bak" porch, breakfast room, kitchen and bath furniture for grown-ups—all these products are in evidence. The factory building is a modern two-story brick structure equipped with all directly motor-driven machines of the lastest type, the electric current for power being generated in the company's own power house.

Producing 200 different styles, sizes and designs of a widely diversified line of furniture, this company has proved that it is possible to eliminate the usual seasonal fluctuations in produc-

The illustration at top of page shows one of the two heat-diffusing units by means of which fresh air is drawn in from the outside, heated and circulated within the finishing room.

tion and sales—at least in this branch of the furniture industry.

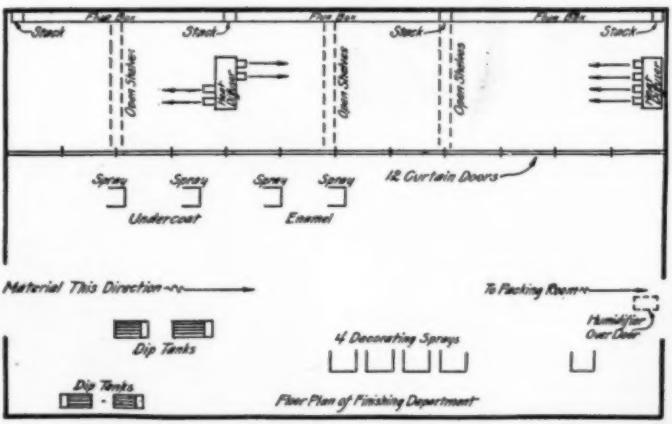
The need for economical production exists in all phases of the furniture industry, but especially so in the manufacture of this particular line of furniture, due to the class of competition—some of which is foreign—and the obviously lower selling prices in comparison to some other lines.

This company has two saw mills—one in Indiana and one in Kentucky—where oak, beech, gum and sycamore squares are cut and shipped in to be used on the adult-size furniture and larger parts of the juvenile line. All of the small parts including turnings are made from the waste of the company's own and other mills, this being purchased on a tonnage basis and shipped in by barges traversing the Ohio river.

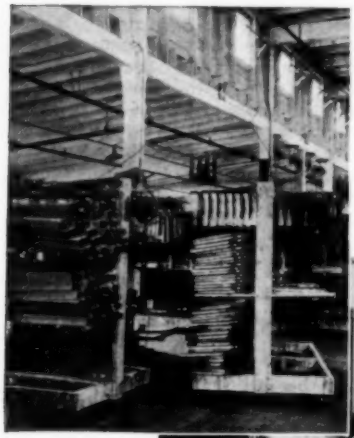
All machine work and the partial assembly-in-the-white operations are performed on the first floor, the entire second floor being occupied by the finishing, drying and packing departments.

Convenient portable racks, mounted on ball-bearing casters, are used for transferring and holding material in process of manufacture. As is shown on the accompanying floor plan layout, one side of the second floor is used for finishing. The other side is one large dry room divided into separate rooms by open racks for small parts. It is designed to allow free access of circulating air through the entire room. The finishing department is heated by steam pipe lines as shown in some of the illustrations accompanying this article. It is also equipped with a humidifier, so that atmospheric conditions inside the department can be controlled at all times.

After the original machine sanding on the first floor, material in the white is elevated to the second floor at a point near the back of the building. Entering the finish-



This floor plan layout of the finishing department shows the arrangement of equipment which includes air-conditioning apparatus of modern type. The "heat diffuser" near the upper right-hand corner of this drawing is pictured in the circular illustration at the beginning of this article (page 24).



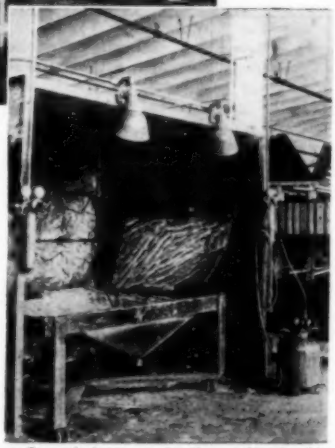
Above: Some of the portable racks on which finished parts are placed to dry, and by means of which material in process is transferred.

At right: At the decorating spray booths where spray-stenciling, shading and other forms of decorating are performed.

ing room, the undercoat is applied either at the spray booths or in the dip tanks. The price of the finished article, and the design of the part determines the method of application. Parts or entire articles in the lower-priced lines, and also those pieces that will drain effectively and economically, are dipped, while the more expensive pieces and the more intricate parts receive their undercoatings at the spray booths.

The freshly-coated parts are hung on racks and placed in the dry room where they remain from 8 to 12 hours. After they are perfectly dry, the surface of the undercoat finish is hand sanded and followed by the enamel coat which, like the undercoat is either sprayed or dipped.

After the enamel coat is dry, the work-in-process advances to the decorating booths where the various kinds and classes of decoration are applied—



One of the spray booths equipped with movable baffle boards and a drain table in which some of the waste spray is caught.

Before you *Spray*

Get the coating right. Good finishing starts in the *finish manufacturer's* laboratory and depends on correct and complete knowledge of product and conditions in the customer's plant.

We maintain a complete and practical baking, spraying and finishing department with trained operators in addition to technicians in our chemical laboratory. Every recommended formula is demonstrated on the product for which it is prepared.

Write for complete details regarding this trouble-preventing service for YOUR production.

IMPERVIOUS VARNISH COMPANY

Manufacturers Industrial Finishes
General Office
436 Seventh Ave., Koppers Bldg. Pittsburgh, Pa.

IMPERVIOUS

protective coatings
any surface - any product

Lacquers, Varnishes, Japans, for Wood, Iron, Steel, Aluminum

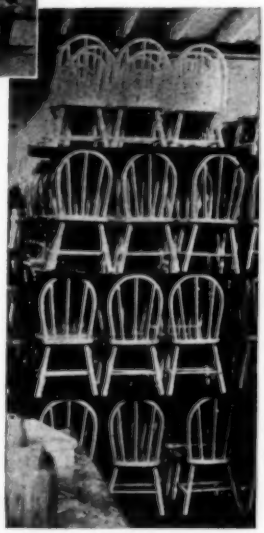
some by spraying colored lacquer through stencils to form the design, stripes, etc.; others by masking and edge tinting, and still others by the use of decalcomania decorations. Some of the stencil designs require as many as five different colors.

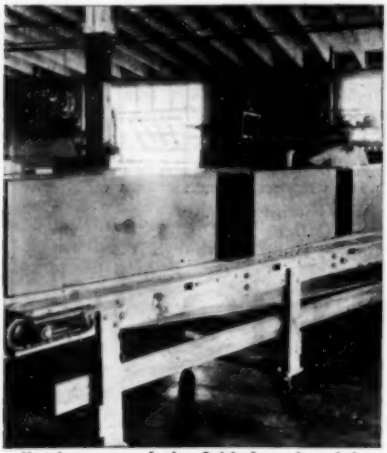
Some of the articles are given a natural wood finish, receiving a filler coat followed by a sprayed-on coat of varnish. A feature of the varnish spray booth is its movable baffle boards on three sides of the booth, and the drain table on which the material is sprayed; these accessories are designed to receive and drain back all excess varnish.

The drying room is equipped with two heat-diffusing units, each set of two outlet vents being capable of circulating heated air for a distance of 150-ft. In one of the typical controlled-heat units, a pipe at the bottom is arranged to allow the fresh outside air to be drawn into the heater; an additional fresh air pipe leads up to the fan motor. In this metal box there is a small propeller to force the fresh air into the motor, keeping it cool irrespective of the room temperature.

At left: The humidifier (see floor plan) by means of which the percentage of moisture-content in finishing room atmosphere is controlled.

Below: Finished chairs stacked in tiers, with fiber board between, awaiting the packing operation.





Filled cartons of the finished product being moved by belt conveyor operating over a portable table.

The action of this heat-diffusing unit is such that it not only draws in fresh outside air, but the lower part of the metal box is open, permitting the drawing in of air from the floor through the coils and blowing it out of the vents at the top. Flues for exhausting the air are lo-

Better than Lacquer or Varnish

with the advantages of both

Ever since their introduction less than two years ago Murphy Flexible Lacquers have been revolutionizing the ideas and methods of finishing experts in many different industries. For these lacquers combine the important advantages of ordinary lacquer with the best features of varnish.

For instance Murphy Flexible Lacquers polish to an even greater brilliance than varnish and yet have the quick dry of lacquer.

They act like varnish in many respects—they build like varnish and rub with the characteristic varnish pull; they have a plastic resistance to the expansion and contraction of wood and metal; like varnish, they toughen with age but do not chalk or check; and they have the appearance and "feel" of varnish, instead of the cold glass-like surface of lacquer. They are resistant to humidity checking.

These are just a few of the outstanding facts about Murphy Flexible Lacquers — yet quite enough to interest anyone concerned with fine finishing. We shall be glad to send you complete information or to give you a demonstration.

MURPHY VARNISH COMPANY
Newark San Francisco Chicago

Essex Varnish Company, Newark
(Associate Company), *Baking Material Specialists*

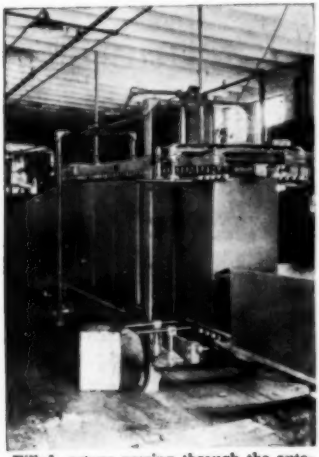
Murphy *Flexible* Lacquers

are revolutionizing wood and metal finishing

MURPHY FINE FINISHES

Famous for 64 years among architects, master painters and makers of products requiring a fine finish.

Air-drying and Baking Varnishes
Enamels, Lacquers and Stains for Brushing, Spraying and Dipping



Filled cartons passing through the automatic sealing machine.

cated all along the outside wall, with openings at 4-ft. intervals along the floor, and four stacks against the wall having shutter openings the entire height, assuring complete exhaustion of fumes.

After the finishing operations have been completed the furniture is placed in the packing room, chairs being stacked in tiers to the roof, with fiber board between each tier. All furniture, excepting kitchen and porch furniture, is packed semi-knockdown in approved fiber cartons. For example, a child's table, with top and legs loose and two chairs, would be packed in one container.

A novel movable conveyor table, with a moving belt top, transfers filled cartons from one side of the packing room where the furniture is stacked, to the two package-sealing machines. After passing through these machines the cartons are sent back to the first floor by a gravity conveyor to be loaded into cars for shipment.

Finishing Inlays, Veneers

Inlaying is generally done with a wood contrasting in color to the main surface in which it is placed. The inlay material is usually stained before it is glued or set into the surface. Filling and finishing are then performed in the usual manner.

To finish veneered surfaces composed of several kinds of woods in color and arranged in an attractive design, my recommendation is to stain the surface with an alcohol penetrating stain that will penetrate the hardest of these woods. The stain should be of suitable tint or color for the lightest of the woods. The darkest woods "will take care of themselves."

What are known as "sour spots" sometimes occur in surfaces to be stained. These are usually caused by the cross sticks used in stacking the lumber. It is often difficult to make these spots take the usual alcohol stains. My plan is to mix a little lacquer thinner in the alcohol stain and treat these spots with it. This will penetrate the obstinate "flinty" places when everything else fails.—M. V. Leach.

Behr-Manning Abrasive Catalog Lists Simplified Line

Behr-Manning Corp., Troy, N. Y. has ready for distribution the Behr-Manning Coated Abrasive Price Book No. 1. This catalog contains tables of sizes and varieties of coated abrasive products that conform with Simplified Practice Recommendation No. 89, as formulated by a general conference of manufacturers distributors and users, and as published in the Elimination of Waste Series of the United States Dept. of Commerce. It contains 24 pages, page size 10⅝x7¾-in. This size page was chosen on recommendation of the National Assn. of Purchasing Agents and it is called "The National Standard Catalog Size."

LABORATORY TEST PROVES PURE SHELLAC SUPERIOR TO SUBSTITUTES

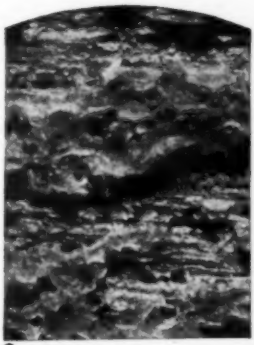
A large research laboratory has just completed a competitive test between Pure Shellac and a widely advertised shellac "substitute". Both products were applied to wooden panels and subjected to the laboratory's standard accelerated weathering test to determine which finish would best stand the gaff.

The accompanying unretouched microscopic photographs tell their own story. After 163 hours of exposure to the laboratory's wind, salt spray, humidity, rain and sunlight, the so-called "substitute" had almost disappeared. It had worn off; it had cracked; it had washed off! It could be rubbed off with the thumb!

The Pure Shellac finish, on the other hand, had worn smoothly and naturally, just as it should. It had not crumbled at all. It was still on the job, going strong.

Don't be deceived by misleading claims or by misleading names! Insist on Pure Shellac; accept nothing else. Be sure the word "Pure" (Pure Shellac) is on the label of the shellac you buy.

American Bleached Shellac Manufacturers Association, 330 Seventh Avenue, New York, N. Y.



This is all that was left of the so-called "substitute" at the end of the 163-hour test. Only rough fragments of the finish remain; note the grain of the wood showing through.

Here is how the Pure Shellac finish looked after 163 hours of weathering. Worn smoothly and naturally, it continues to protect the wood as it should.

The word "Shellac" standing alone on a label may mean little. But "Pure Shellac" on an Association member's label means that his product has not been adulterated and that it measures up to the rigid standards of the American Bleached Shellac Manufacturers Association.

THERE IS NO SUBSTITUTE FOR

PURE SHELLAC

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"To the lay mind, a service plant is perhaps some place where planes are re-fueled and minor repairs are made. This theory is all wrong! The service plant is an essential and necessary adjunct to the airplane industry, and not a fuel station.

"Stripped of all technical or aeronautical names or terms, the service plant is nothing more nor less than an airplane repair shop, much akin to a railroad repair shop.

"At present, service plants are operated by all airplane manufacturers; there are a few private service plants and there is room for more."—

Dennis O'Brien

AIRPLANE FINISHING SERVICE

Foreman Finisher in Service Dept. of [illegible] Aviation Corp., explains the purpose of the service division in the airplane industry and gives specific information on refinishing replaced and repaired parts on airplanes

By Dennis O'Brien

THE AVERAGE MAN knows little or nothing about an airplane service plant. The airplane service plant is usually operated by an airplane manufacturer or by a transport company. As the number of airplanes increases, the number of service plants will increase in even a greater proportion to the number of automobile service repair shops. While the manufacturer finishes a plane but once, the service plant might perform a number of both minor and major finishing operations in the course of the ship's life, in addition to doing repair and replacement work.

When an airplane arrives at the service plant, it is minutely inspected and regardless of what specific trouble has made it necessary to service the ship, in practically every case some finishing will be needed before it leaves.

The repairs may necessitate a complete recovering job on a wing, a fin or rudder, or perhaps the entire tail surface. A few small patches may be required on the underside of the fuselage. There may be holes caused by stones or pebbles having been shot through the fabric in taking off or landing. All these places require attention before the plane will again take to the air.

Patching Fabric

Patching is by far the most common repair, and yet if this is done by an inexperienced workman it will nearly always result in a loose, unsightly and at best, temporary job. A patch can be applied to the fabric in such a way as to make a neat clean-cut job, if it is performed by a competent workman. When applying a patch, the best method is to clean the surface of all pigmented

dope from the area where the patch is to be placed. Dope thinner is a satisfactory solvent for this purpose and unless this is used the adhesion so necessary for a good job will be lacking.

When the pigmented dope is clear, apply clear dope to the area to be patched; place the patch on the surface and brush clear dope on the outer edges of the patch. On the first coat, be careful to avoid applying dope to that part of the patch which covers the hole. When only the edges of the patch are doped on the first coat, that part of the patch immediately covering the hole will draw taut, and a smooth patch will result. On the other hand, if the entire outside of the patch is doped, the part that covers the hole will sag or wrinkle, and an ugly job will appear.

The patch should receive five coats of clear dope, the second and subsequent coats being applied over the entire patch. After the second coat and every coat applied thereafter, a light sanding will enhance the beauty of the job

Where the hole in the fabric is large, it is advisable to draw the edges together by sewing; for this I prefer an upholsterer's half-round needle.

Cracked or checked dope mars the appearance of the plane; lack of elasticity in the dope certainly has something to do with this condition, although plasticizers are to some degree eliminating this. If the entire fuselage finish is cracked, the only economical course to pursue is to rip off the fabric and recover the ship.

I have been experimenting with cracked and checked dope and, on small surfaces, I have successfully remedied this condition. Rub the cracked surface with dope thinners and, when dry, sandpaper the surface. Then apply two coats of a suitable sanding surfacer. When the surfacer is dry, sand with water, using Wetordry sandpaper, after which the pigmented dope can be applied.

Repainting

Some ships will come into the shop for repainting. It is here that the old lettering and insignia becomes a problem. If the lettering has been done with a clear japan color, it will not be necessary to remove the dope; lacquer can be applied without any fear of the color rising.

However, if any varnish was incorporated with the color used for lettering, or if a coat of varnish was applied over the lettering, then the lettering must be removed. Under no circumstances can you use a varnish or paint remover, or dope or lacquer thinners to remove such lettering.

To remove this lettering, use benzol and steel wool, or rub briskly over the letters with an old piece of burlap dipped in the benzol. This will remove them efficiently and economically. In re-lettering, it is advisable to use only a clear japan color, as it will save time and money on future jobs of refinishing.

Cleaning Metal Surfaces

When a ship is brought into the service shop, it is bound to require cleaning. In all probability dried mud is on the under part of the fuselage and thick grease and oil are on the cowling and other parts of the ship where the engine is located, and on the landing gear. This mud, grease and oil must be removed before any refinishing can be attempted.

Gasoline is generally used for

cleaning, although I could never understand why. Cleaning with high-test gasoline costs a lot of money and it is not thorough. There are any number of cleaning compounds or industrial cleaners on the market today that are foolproof, efficient and economical. One pound of such cleaner in hot water will make three gallons of solution and the cost of the three gallons will be approximately ten cents. Compare this cost of ten cents as against the cost of three gallons of high-test gasoline and you need no A.B. degree to figure it out.

On a repair job, if the metal cowling and other metal parts of the ship require painting, it is well to inspect it thoroughly. If the lacquer film is broken, I would advise removing it, as finishing over "broken lacquer" does not make a presentable job.

The lacquer can be removed with lacquer thinners. If, when the surface is clean, there is any evidence of rust, it should be destroyed and a rust inhibitive paint should be applied.

Names of Colors

Colors are forever changing in names, at least—if for no other reason than to have something fancy attached to the color. We have colors named after birds, furs, trees, and what not. Many of these are rather confusing as to what color they might be. I have selected a few of the most popular and arranged them in alphabetical order, with some definition or description of what they are like.

A

Afghan—bright red.
African Brown—very dark brown, almost black.
Almond—dark tan.
Almond Green—medium light green with a gray cast.
Amber—golden yellow.
American Beauty—color of a deep rose.
American Vermilion—brilliant red.
American Red—brilliant red with a yellow hue.
Amethyst Troy—pale cream glazed with raw sienna.
Antwerp Blue—dark blue.
Anemone—pinkish lavender.
Apricot—pinkish yellow.
Apple Green—light yellowish green.
Arabian Blue—medium grayish blue with a green cast.
Argent—warm gray.
Armada Brown—dark slightly red brown.
Ashes of Roses—light rose color with a faded brown cast.
Athenia—medium dark old rose.
Atmosphere—light tan.
Auburn—reddish brown.
Artillery Red—very bright yellow red.
Azure—deep gray blue.
Aureolin—light chrome yellow.

B

Baby Blue—pale blue.
Baby Pink—pale pink.
Battleship Gray—medium gray.
Bay—light reddish brown.
Beach Gray—light gray with a tan cast.
Beaver—brownish gray.
Begonia Red—light orange red.
Beige—light tan.
Beige Ivory—cream ivory tint.
Brewster Green—very dark green.
Briar Rose—soft medium shade of rose.
Brick Dust—light reddish brown.
Buck Red—reddish brown.
Buckskin—light yellowish tan.
Buff—medium tan with a yellow cast.
Burgundy—wine.
Burnt Orange—orange with a reddish cast.
Burnt Sienna—rich reddish brown.
Burnt Umber—rich dark brown.

C

Cadet Blue—medium grayish blue.
Camel—light grayish tan.
Canary—bright yellow.
Canton Blue—medium bright blue.
Canton Green—pale light green.
Cardinal—medium red.
Carmel—dark brown.
Carmine—brilliant red.
Canot—medium light yellow orange.
Castilian Red—bright red.
Celestial Blue—very light blue.
Cerise—American red.
Champagne—light creamy tan.
Charcoal Gray—dark gray.
Chartreuse—light grayish green.
Cherry Red—fairly bright red.
Chestnut—rich deep brown.
Chu Chin Blue—light Copenhagen blue.
Chinese Red—bright yellow red.
Chinese White—white without any yellow or blue.
Chocolate Brown—rich dark brown.
Chrome Green—light dark (medium).

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Chrome Yellow—light medium orange.
Ciel Blue—sky blue.
Cinder—medium gray.
Cochun Red—fire engine red.
Cocoa Brown—medium brown.
Copenhagen Blue—medium blue.
Copper—color of copper.
Coral—reddish orange.
Crab Apple—reddish orange.
Cranberry—dark red.
Cream—color of cream.
Cream White—white with a yellow cast.
Cremnitz White—pure white.
Creole Brown—light grayish red.
Crimson Red—deep red.
Crimson Lake—deep transparent red.
Crystal—transparent white.
Cuckoo Tan—tan darker than cedar wood.
Cupid Pink—light pink.

D

Dawn—light tan.
Delft Blue—medium blue.
Desert—dark tan.
Dove Gray—medium gray.
Drab—dark shade of grayish brown.

E

Ebony—black.
Ecru—cream shade.
Edgewood Blue—color of old blue china.
Emerald—bright green.
Empire Blue—medium blue.
Empire Green—medium dark green.
English Red—scarlet.
Evenglow—medium gray with lavender tint.

F

Fadent Rose—dull old rose.
Fawn—light tan color of fawn.
Fire—color of fire.
Firecracker Red—bright red orange.
Flake White—pure white.
Flame—bright orange red.
Flesh—pale pink, skin color.
Forest Brown—very dark brown with an olive cast.
Forest Green—medium dark green with olive cast.
French Gray—medium light gray.
Frosted Mango—yellow orange.

G

Gamboge—yellow.
Garland Green—soft medium green.
Garnet—dark red.
Gazelle—light tan.
Gendarme Blue—dark peacock blue.
Geranium—color of a red geranium flower.
Glen Blue—shade darker than baby blue with greenish cast.
Gobelin—medium blue with gray cast.
Gold—color of gold, deep yellow.
Golden—light khaki.
Golden Brown—medium brown, gold cast.
Golden Fawn—deep golden.
Golden Poppy—brilliant orange.
Golden Rod—bright yellow.
Golf Green—dark green.
Gooseberry Green—light green.
Grackle Blue—light navy.
Grape Nut Brown—medium brown.
Gulf Gray—light gray.
Gun Metal—dark gray.
Gypsy Red—medium dark red.

H

Harvest—medium blue with gray cast.
Havana Brown—light brown.
Heliotrope—lavender.
Henna—reddish brown.
Holly Green—green with a black tone.
Holly Red—fairly deep high red.
Honey Beige—light shade of tan.
Honey Dew—light pinkish yellow.
Hunter Green—dark green.

I

Imperial Blue—very bright blue.
Independence Blue—light navy.
Indian Red—deep red.
Ivory—cream color.
Ivory Black—clear jet black.
Ivory White—white with a slight cream cast.
Ivy Green—soft medium green.

J

Jade Green—bright medium green.
Jet—black.
Jockey Red—bright red.
Jungle Green—deep rich forest green.

K

Kaffa Brown—dark brown coffee shade.
Kasha Biege—grayish sand.
King's Yellow—bright medium yellow.
Kit—silver gray.

L

Lampblack—true black.
Laven Green—medium light green.
Laurel—dark green shade.
Lavender—light purple.
Leaf Brown—light golden brown.
Leaf Green—light green.
Leaf Mold—rich brown.
Leather Tan—brownish tan.
Legion Blue—bright deep blue.
Lemon—yellow.
Lemon Cream—creamy yellow.
Lilac—very light purple.
Lindy Blue—bright medium blue.
London Gray—gray slight blue cast.

M

Magenta—dark purple red.
Mahogany—dark reddish brown.
Maize—light yellow (corn).
Mandarin—yellow red.
Marine Blue—light navy.
Maroon—dark red.
Mauve—brilliant violet hue.
Mauve Blush—light tan with rose tint.
Marverose—deep rose.
Mayflower Pink—medium grayish pink.
Melon—red, like inside of watermelon.
Mink Brown—medium brown.
Misty Morn—light mauvish taupe.
Moss Green—soft medium green.
Mulberry—reddish purple.
Mustard—khaki tan.
Myrtle Green—dark green.

N

Naples Yellow—bright deep yellow.
Napoleon—very bright blue.

Again—Sherwin-Williams fills a long-felt need

Opex Sanding Sealer No. 41

Specially prepared to meet the insistent demand for a sanding sealer with still *higher building properties.*

Because of its quick, easy sanding properties it has won wide popularity in piecework shops. Finishers consider it an indispensable adjunct to a clear lacquer finish.

It seals tight over both close grain and open grain woods and stays tight after sanding. While it has a considerably higher solid content it retains toughness so essential to a first coat.

No brittleness as in shellac. As a combined sealer and filler it knits perfectly with lacquer.

Ready to spray directly from package. May be used for brushing or dipping small surfaces.

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Natural Gray—white with grayish cast.
Navy Blue—dark blue.
Nell Rose—medium rose.
New Gray—light gray.
Nickel Gray—medium light gray.
Nutria Tan—medium tan.

O

Oak Brown—medium golden brown.
Oak Buff—light brown.
Ocher—medium yellow.
Old Rose—soft rose with grayish cast.
Olive—dull brown green.
Olive Gray—dark gray with greenish cast.
Olive Green—green with yellow cast.
Orchid Lilac—lavender purple.
Oxford—dark gray.
Oyster—white with cream cast.

P

Palmetto—soft medium grayish green.
Pansy—purple.
Parchment—deep cream color.
Pans Gray—medium gray.
Patou Gray—light tan rose tint.
Payne Gray—medium gray, blue tint.
Peach—light yellowish pink.
Peach Glo—delicate pink.
Peacock Green—bluish green.
Pea Green—pale grayish green, yellow cast.
Pearl Blush—shell pink.
Pearl Gray—very light gray.
Pencil Wood—deep reddish tan.
Periwinkle—medium blue, lavender cast.
Permanent Blue—medium dark blue.
Persian Pink—deep grayish pink.
Petunia—medium purple.
Pistachio Green—light green.
Platinum—light gray color.
Polychrome—mixed colors.
Popcorn—light yellow.
Poppy Red—red of poppies.
Powder Blue—light grayish blue.
Powder Gray—medium gray with light blue cast.
Prussian Blue—rich dark blue, green cast.
Purple Lake—crimson having a purple hue.

Q

Queen Blue—medium light blue.

R

Raw Sienna—bright brownish yellow.
Raw Umber—dark greenish brown.
Reindeer Tan—dark tan.
Reseda Green—medium grayish green.
Rose—deep pink.
Rose Beige—medium tan, rose cast.
Rose of Sharon—bright old rose.
Rose Pink—purple.
Rose Glow—tan with brownish rose cast.
Royal Blue—very rich blue.
Royal Purple—bright purple.
Ruby—deep rich red.
Russet—reddish brown.
Rust—russet buck brown.
Rust Brown—medium reddish brown.

S

Sage—subdued gray green.
Sailor Blue—light navy.
Sand—light tan.
Sap—vivid light green.
Sapphire Blue—bright blue.
Santerone—very light tan.
Scarlet—bright red.
Scarlet Lake—bright red.
Seal Pink—deep pink.
Seal Brown—dark brown.
Sepia—shaded brown.
Shadow Green—yellowish medium green.
Shagbark—dark sand tan.
Shell Color—light brown.
Shell Gray—very light gray.
Shell Pink—deep yellowish pink.
Silver—very light gray.
Silver White—white with silver cast.
Silver Wing—light gray.
Sky Blue—light blue.
Slate Blue—dark gray with bluish tint.
Slate Gray—medium light gray.
Smoke—grayish cream.
Spring Green—light, bright green.
Spanish Wine—rich dark red.
Steel—medium light gray.
Steel Blue—grayish blue.

T

Tangerine—bright reddish orange.
Taupe—brownish gray.
Tawny—dull soft biege.
Tea Yellow—pale yellow.
Terra Verti—dull dark green.
Tiger Lily—salmon.
Tile—brick red.
Toast—medium tan.
Topaz—yellow.
Turquoise—light blue with greenish cast.

U

Ultramarine—dark blue.

V

Van Dyke Brown—deep rich brown.
Velvet Brown—soft brown.
Venetian Red—light red color.
Verdant Green—fresh grass green.
Vermilion—bright red.
Violet—bluish lavender.
Virgin White—pure write.

W

Walnut Brown—color of walnut wood.
Wine—very dark rich red.
Wintergreen—dark green.

Y

Yellow Ocher—medium light yellow.

Z

Zinc White—Pure bright white.

—J. K. Cooper

An addition of color to certain products not only makes the organization "perk up" but gives the product new possibilities.

DU-PROS
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SHELLAC
Costs less to use

Du-Pros Strictly Pure Shellac spreads farther. It needs less sanding because it lies smoother. Du-Pros dries quicker with a heavier, glossier film. You can test all of these statements by a simple comparison. Try Du-Pros, not only against other pure shellacs, but against shellac "substitutes." Compare prices as well as performance, and when you do this, be sure to consider the cost of thinner. Du-Pros Shellac, in a consistency ready to apply, costs less than other first class finishing materials. Du-Pros is best next to wood.

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CHICAGO

Spraying Stain is Economical

Pointing out the practicability of spray staining and explaining how, why, when and where it can be used effectively and economically

By M. M. Miller

IN MANY factories today the management is permitting finishers to put on stain by means of the slow brush method when they could be speeding up production and cutting costs by spraying the stain with spray guns.

There are several methods of applying stain, each having its advantages and disadvantages, and it is necessary to select the method best fitted for the job. Spray staining can be employed to advantage where there is enough work that requires the same stain, and where the article is not to be stained all over, or when it is too bulky to be dipped. Spraying also has the advantage over dipping in that there is no need to lay off excess stain or runs—if the spraying has been properly applied.

Use Old Spray Guns

The apparatus required is of the simplest. Nearly every finishing room has some old spraying guns and equipment which have outlived their usefulness for the spraying of shellacs, lacquers, varnishes and enamels. This equipment can be used, as the guns need have only a good fit between the needle and nozzle.

The spraying need not be as particular as when spraying lacquer or varnish but, of course, reasonable care must be taken to apply the stain evenly. For coating small pieces, the work is comparatively simple. For large pieces and large panels, the best results are obtained by applying a light coat across the grain of the wood, followed by a medium coat applied with the grain.

To obtain the very best results it is best to have the gun adjusted to give only a light spray, or have an operator who is experienced enough to pull the trigger the correct distance to obtain the proper amount of stain required. The latter method would also enable the operator to judge the amount of stain he has put on.

And Low Air Pressure

A very low air pressure should be used; 10 to 20-lbs. should be sufficient. It is only necessary to have enough pressure to atomize the material, as the stain will blend itself out so that no splotched effect will be noticeable. Also, by using low air pressure it is not absolutely necessary to use a spray booth, since the stain particles which miss the surfaces are of such character that they rapidly sink to the floor—and the floor, can be covered with sheet metal or sawdust to catch this waste.

The same arguments against spray staining arise now as they did when the spray gun was first introduced for finishing, namely waste of material. This is very true, but material is very cheap

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Now-Heavier in Body, Greater Value for the Money.

It Sands — With remarkable freedom and ease within a very short time after application.

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MARIETTA WOOD AND METAL FINISH SPECIALISTS

compared to labor, with overhead tacked on; and simple trials will easily prove this.

What The Tests Showed

A large firm manufacturing store fixtures in quantities recently ran comparative tests on about 400 counters. Operators were switched around; men of various capabilities were tried out and everything was done to make sure that the quality of the work turned out was the same for either method.

Each counter had 36-sq. ft. to be stained. The average results obtained were as follows:

Time spent to stain one counter by spraying—2.8 minutes.

Time spent to stain one counter by hand—15.5 minutes.

Amount of stain used per counter by spray guns—1.65 pints.

Amount of stain used per counter by hand methods—1.45 pints.

The saving in labor was enormous and the extra material required was dwarfed into insignificance by comparison.

Dry Spray; Pin Holes Grayness; Blushing

Foreman Finisher of the Storekraft Mfg. Co., reveals the causes of certain common lacquer troubles and tells how to remedy them

By E. B. Smethers

LACQUER, when applied correctly, usually works very satisfactorily, but there are a few minor troubles that sometimes show up.

Dry spray is identified by a sandy appearance on the finished surface, and is caused by lacquer spray hitting surfaces for which it is not intended. For example, in spraying a table, one leg has been sprayed and in coating the other leg, lacquer hits the finished leg in the form of small drops, which solidify instead of flowing out. A careful operator will spray the article so that spray dust will fall on unfinished work which, when sprayed immediately thereafter with a wet coat of lacquer, will be redissolved.

Pin Holes

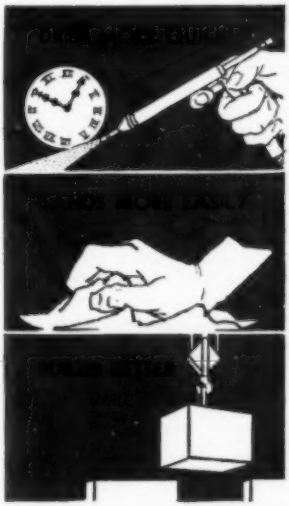
Pin holes, as a rule, are caused from poor filling. If the pin holes are directly over pores in the grain, that is the trouble. If the pin holes are very numerous and are irregularly distributed without regard to the pores in the wood, there is no one particular fault. It might be caused from lacquer being applied too heavily, spray gun improperly adjusted, air pressure too high for the type of lacquer being used, or improper handling of the spray gun.

Grayness is usually caused by the finish being oil rubbed too soon after application. Filler turning gray can usually be remedied by adding more color and allowing more time to dry.

FLINT LACQUER PRIMER

THE PERFECT BUILDING SEALER

TRADE M.&L. MARK



FLINT LACQUER PRIMER is not a NEW building sealer. It is the result of gradual perfection of the first successful undercoating for clear lacquer.

You will find that this improved sealer has more solid body and greater filling power ... and that it dries more quickly, sands more easily, and forms a permanent bond between the lacquer and the wood.

MAYER & LOEWENSTEIN

43-43 Vernon Blvd. Long Island City, N. Y.

ESTABLISHED 1846

Blushing

Blushing is a common fault in the less expensive lacquers. It is caused by the absorption of moisture during the drying process. This usually happens in the summer months, on hot humid days. Most lacquer manufacturers furnish a retarder which greatly reduces this fault.

Thinning

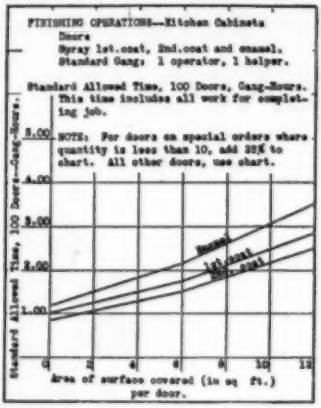
The writer finds it more satisfactory to buy lacquer already thinned, rather than adjust it after it has been received. The lacquer is ready for spraying under average conditions but, of course, there are cases when a little thinner must be added. If a small spray nozzle is used with low air pressure, the material will not atomize properly unless thinned. There are also cases where just a thin coat of lacquer is desired. More speed will result and less lacquer will be used if the material is thin.

Spraying Time Standards

Because wage rates in different localities vary greatly, dollars-and-cents piece rates for specific operations afford an inadequate means for the superintendent to compare his operating conditions with the conditions existing in other plants.

Some definite figures as to the time required first for undercoating, second for undercoating and enamel finishing of doors for kitchen cabinets, will be of interest to readers of INDUSTRIAL FINISHING.

The accompanying chart shows such time applied to finishing cabinet doors in enamel finish. The time given, in gang-hours per 100 doors, covers all the work necessary to be done by the operator and helper, and includes provision



for a 20 percent bonus when these times are attained.

Where the quantity of doors run at one time is less than ten, a 25 percent addition is to be made to the times shown on the chart. Times for doors of specific size may be taken off the chart and set up in table form, if desired.

It is the writer's hope that this short article will be the means of inducing progressive superintendents to place before the readers of this magazine other interesting data based upon their experience. —C. F. Scribner.

Color Number On All Graham-Paige Cars

Besides the regular chassis number and engine number that every automobile must have, Graham-Paige models now reach their owners with a third set of numerals that eliminate what has always been a frequent source of confusion among owners, service stations and factories. A "color number," stamped in a metal plate permanently affixed to each body, combined with a system of record-keeping at the Graham-Paige factory, guarantees correct color matching of any unit of a body whenever a replacement is ordered, without chance of error, no matter how old the car may be when the need for body work arises.

Two - - *High-bake* - - - - - *Rust Preventive* Primers

Both are highly resistant to salt moisture. They provide a perfect surface for all lacquer and baking enamels and are practically *rustproof.* Your trial will convincingly prove the remarkable qualities of these unusual metal primers . . . And remember—our Technical Staff is always ready to work with you on your problems.

#1000. **For use under Lacquer Enamels. Bakes hard in 1½ hours at 350° F. Has remarkable adhesion to metals and forms a perfect bond with Lacquer Enamels.**

#1002. **For use under all Baking Enamels and Japans. No sacrifice of gloss through absorption. Has same excellent adhesion as #1000. Bakes hard in 1½ hours at 350° F.**

Address—Industrial Division

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THE JOB FINISHING SHOP

Experienced finisher reveals some "information about the inside workings of the job finishing shop," including how costs are estimated, how trial runs are made, and what methods of finishing and decorating are employed

By C. S.

A NUMBER of the smaller manufacturers do not finish their own products and as a result they must rely on the job finishing shop. Here is some information about the inside workings of the modern job finishing shop—where workmanship and prices must be right, and where skilled men are employed. These job finishing shops are able and equipped to handle large quantities of products to be finished complete—from the cleaning of the surface to the spraying, dipping or brushing (whichever method of application is best suited) and the final rubbing and polishing.

Estimating Costs

When a manufacturer submits a sample of his product to us for quotations on finishing in large quantities, we do not indulge in any guess work, but insist on making a trial run on a small quantity. One of the first and most important considerations is the retail price of the product; a finish is worked out which will be in reasonable proportion to the selling price. For example, an article to sell for 25c will not stand a 20c finish.

Trial Runs

This trial run enables us to find the most economical method to employ for finishing in large quantities; then we can give our customer an intelligent figure. Each operation is carefully investigated for possible lost motion, and the slack is taken up wherever possible.

When the trial run has been completed, the finished product is submitted to the customer for examination along with price quotations. If it is satisfactory we set up for the job. However, if the customer feels that the quotations are too high we point out to him, if we can, where possible reductions may be made by cutting operations where such cuts will have the least effect upon the quality of the finish.

Our method of quoting prices has won favor with our customers. I believe that in these days of keen competition the finisher must do his part toward keeping costs down, and still he must produce a finish that has sales appeal. The day of giving quotations on finishing by rubbing your chin, gazing out at the sky and guessing high enough to avoid losing money, is over.

Selection of Materials

The job finishing shop is called upon to finish a great variety of wood and metal products. In many quantity production jobs special colors are called for. In such cases we usually send a sample article to one of the paint and varnish manufacturers to be finished in the special color. This manufacturer works out the

proper finish suitable for the color test, and for the requirements of adhesion, body and durability. I believe that the making of paints, varnishes or lacquers is not our business; accordingly, we leave it to those that know more about it than we do. This saves us the time and trouble of experimenting to find the proper color and finish.

Dipping; Brushing; Spraying

We employ the dip, brush and spray methods; also we use varnishes, lacquers, and enamels. It is our policy to choose a method and a material that is best adapted for each particular product.

While we recognize and appreciate all the merits of the spray method, nevertheless we find that in this line of custom work, we are occasionally obliged to go back to the brush method on certain classes of work, which otherwise would require a great deal of masking and plugging of holes on small articles. As a rule we only revert to brushing when the finishing can be done at less cost this way for the customer.

Most of our jobs are finished in lacquer, although we do finish large quantities of small wood articles in four-hour enamels. We have found these quick-drying enamels are particularly well adapted for this class of work, on account of the building or "bodying" properties which can be obtained with the least number of coats—thus eliminating extra labor.

Variety of Decorations

Decorations, put on by stencils, decalcomanias, the silk screen process and striping are also employed to a considerable extent. The screen process is used in decorating large quantities of articles. In making up a silk-screen stencil, we begin by first sketching a suitable design or ornament on paper; then we submit this to the customer. If it is satisfactory the screen is made and charged to the customer according to the time and material used in making it. The screen is then used in producing a large number of impressions at small cost per piece.

When a two-color design is used, a second screen is made. This, of course, increases the cost of the job. As previously mentioned, consideration must be given the retail selling price of the product as to whether this second color can be permitted.

Furniture finishing and decorating is becoming more of an item in our line every month. The color craze is still in vogue and this stimulates business for the job finishing shop. We also handle a great variety of furniture which is mostly finished in light tones with trim and decoration to harmonize with present styles. Breakfast furniture has become a fairly good business in the finishing line.

Antique furniture still holds its place in the finishing shop. Most of this work is finished in dull black, with a considerable amount of hand striping and decoration in antique gold. In some cases we are called upon to reproduce original designs and finishes.

Clear Lacquer Primer

For some time there has been quite a demand for a lacquer primer that could be safely and satisfactorily used on wood. Many lacquer manufacturers have done considerable work on such a primer but I believe most of them have failed to produce a satisfac-

tory product from one standpoint or another. The chief faults have been lack of filling properties and the difficulty of sanding the primed surface.

Through the use of a pigment of a transparent nature, it has been possible to get good filling and easy sanding properties without sacrificing drying time or durability. The finished product resembles somewhat the varnish pigment first-coaters formerly used quite extensively on chairs and other furniture, except this lacquer primer is built on a nitrocellulose or lacquer base which gives it waterproofness, quick drying and durability. The primer has a cloudy appearance in the package, but when applied to the work is perfectly transparent and does not obscure the grain of the wood.

The primer should be reduced at the rate of about two parts of primer to one part of lacquer reducer for spraying, and it will dry thoroughly hard to sand and recoat in about five hours. It sands easily without gumming the paper and leaves the wood perfectly smooth and glass-like. Succeeding coats of lacquer are held out remarkably well, and do not sink into the wood.

This primer can be used clear or, if a color is desired in the priming coat, a small quantity of any shade of lacquer enamel can be added. Under ordinary conditions about one quart of lacquer enamel to one gallon of clear lacquer primer will give the desired results. This gives some hiding power to the priming coat and does not materially affect the sanding properties. If too much lacquer enamel is added, the primer will sand hard and gum up the sandpaper.

Although this clear lacquer primer was originally designed for use on wood, it has been found to adhere quite tenaciously to metal—even to galvanized iron—and can be used on metal if desired. It is not recommended for use on automobile bodies, however. It also adheres to various types of composition quite well and it will be found to be a wonderful lacquer primer for general all-around use on articles not exposed to severe weather conditions.

Production tests in some of the larger furniture factories have been made with this clear lacquer primer and it has been found very satisfactory in every way. Several factories are now using it in production—J. T. Thompson.

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Materials, Methods and Schedules suggested and recommended for Modern Lacquer

WOOD FINISHING

Starting with the wood surface in the white and continuing through staining, filling, drying and rubbing operations—with supplementary explanations about the choice, preparation, application and drying of each type of material

By M. C. Roberts

IT IS IMPERATIVE and highly essential that the wood surface to be finished be evened and made free from depressions. Extra time and labor spent in smoothing the surface of the wood preparatory to the application of protective coatings, or operations incidental to such a coating, represent a saving in the end. A surface well prepared will require fewer coatings and less rubbing.

A wood well surfaced and built-up is comparable to a dwelling built on a rocky foundation, as compared to the same dwelling built on a sandy foundation. It is essential to rub the surface smooth, using fine sandpaper and working with the grain of the wood.

In sanding wood in the white it is reasonable to assume that fine particles of dust are forced into the hollow ducts or pores, therefore it is essential that these dust particles be thoroughly cleaned from the pores of the wood. The recommended method of cleaning away this dust is to wipe the surface thoroughly with clean dry rags, and follow this operation by passing a blast of clean dry air from a spray gun nozzle over the complete surface to be coated. Failure to do this would cause the possible absorption of moisture as well as prevent the filler from taking hold.

Wood Stain

The generally adopted type of stains for use under lacquer are water-soluble stains. These stains are either in powder or crystal form and are entirely soluble in water. Regular faucet water can be used as a dissolving medium; however, distilled water—which is free from impurities—can be expected to give better results. In the expectation of rendering a stain 100 percent soluble in water, it is sometimes advantageous to heat the water.

Oil stains are chemical dyes or stains soluble in regular lacquer solvents. In view of this feature it is reasonable to assume that the stain cutting medium will blend with the lacquer solvents of a nitrocellulose lacquer if the lacquer is applied as a finishing medium, and thereby bleed and cause an unsatisfactory finish.

The cutting medium of water-soluble stains is a solvent—as is ethyl acetate, toluole, etc.; however, water as a solvent is not combatible with the general range of lacquer solvents, therefore it will not cause the "bleeding" effect that is so pronounced with oil-soluble stains. The oil-soluble

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Occupying a prominent place among home furnishings, radio cabinets must necessarily be finished with a value for both beauty and endurance. Here, AD-EL-ITE cabinet finishing materials prove helpful. We have developed *five distinct methods*, of a dependable quality and each applicable according to type of cabinet, and whether an open pore or smooth pore finish is desired.

In your own plant, our demonstrators will show you the latest effects and shortest methods to finish a cabinet in accordance with style and quality, or we will be glad to furnish preliminary evidence by mail, either without obligation.

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stains, in view of their cutting medium, will retard the drying cycle of time of a stain and thus hazardize production. This feature of bleeding, when oil-soluble stains are used, is often prevalent even though sealing coatings of thin shellac are employed.

The principal methods of applying stains to wood are by spraying, dipping, wiping with a cloth and hand brushing. This latter system appears to be the one most widely in use. In the staining of wood, it is essential to allow the stain dissolving medium a reasonable drying time—under conditions as found in the average finishing rooms—before the wood filler is applied. This time is from 8 to 12 hours.

Wood Filler

The type of filler recommended for use on wood is one of special structure. It must in all respects embody in its structure, mediums that are combatible with the finish coatings. The proper type of filler must have filling qualities; it must hold its color and must not soften at the base of the wood pores.

There is on the market today a type of combination stain and filler said to eliminate an operation and hasten production. This might be very well, but consider a powder dissolved in water and the fact that it is brushed into the pores of the wood, and compare that same medium incorporated into a pigmented filler. The answer is that one could not expect richness of tone through a transparent clear wood lacquer.

The paste wood filler, as received, may show a tendency of the light liquid components rising to the top surface; this liquid should be concentrated throughout the mixture by stirring. The usual method of applying filler is with a hand brush. The filler should be thoroughly worked into the pores of the wood. Filler should be allowed plenty of time to dry before it is rubbed; I prefer leaving it overnight. The rubbing operation, by use of a piece of burlap, should entail thorough working of the filler into the pores of the wood, as well as being cross-rubbed. Following this the burlap should be worked with a circular motion to thoroughly insure proper filling of the pores of the wood.

It is essential that the filler in the shipping container be covered to prevent evaporation or the introduction of foreign matter. The filled wood should be given a reasonable air drying time—usually 36 to 48 hours—or it can be force-dried in 12 to 18 hours; but before the application of lacquer the filler must be bone-dry.

Wood Undercoats, Lacquer

After the filler has been thoroughly dried it is a wise plan to seal in the colors that constitute the filler, although it is not always essential, and consideration must be given the nature of the wood. Heretofore shellac was considered the best medium of sealing the filler, but recently lacquer undercoats have appeared on the market which show great promise. When shellac was used, the desired sealing medium constituted a "wash-coat" or just enough of a film-forming medium to act its part as a sealer.

Unfortunately, if the operations leading up to the sealer coat were "dynamited" through, the condition of the wood was such that the practice of "giving an extra heavy coating of shellac to fill

the bill," resulted in brittle films and various upheavals in the ultimate lacquer coatings. This is further explained in view of non-filled and porous sections of the wood receiving excessive amounts of shellac cut in alcohol. The application of sprayed lacquer over this shellac often results in the lacquer solvents softening the shellac-alcohol, and in so doing causing a rupture in the finishing film.

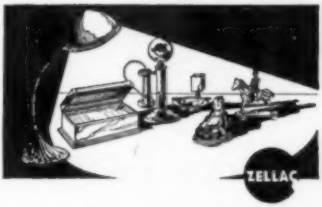
The lacquer undercoats recently introduced are true structural lacquers made on a nitrocellulose base, and in most cases they are built along the excellent lines of a true wood lacquer. Incorporated in these undercoats there is a flattening agent which, when applied over a dried film, stiffens the minute particles of wood, it being remembered that the pores are filled flush with the high spots of the wood. Acting as a sealer, this will produce a film foundation for lacquer coatings. The minute particles of the wood, being impregnated with lacquer materials, will stiffen and a fine sandpapering will smooth this surface out, the inert pigment flattening agent acting as a tooth under the sandpaper.

Clear and Flat Lacquers

The last application of "sanding lacquer undercoater" should be allowed to air-dry from 30 minutes to an hour, depending on room temperature, before the finishing coatings of clear wood lacquers are applied.

Many pages can be written on clear wood lacquers and many theories advanced as to the possible structure of a clear wood lacquer. With the advancements today in this field, some theories

LACQUER IT WITH ZELLAC



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That is the Zeller policy in making and selling Zellac products—specifically formulated to meet each customer's requirements, made and delivered on a quality basis at uniformly fair prices. And that, too, is the policy of the firms with whom we like the most to deal. . . . Are you with us?

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XCEM is a tested cleaning material affording a simple, safe, efficient and economical method of removing accumulations from spray booths. Developed to meet specific needs in the automotive industry, XCEM now finds unlimited use in all industries where finishing materials are applied—it cleans spray booths, spray guns, paint brushes and pots, metal parts and removes old finishes, etc.

Reduces Fire Hazards
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Unclean spray booths present a fire hazard that should not be tolerated. Any moment, the accumulation of lacquer may become a menacing flame to spread and stop production. XCEM easily cleans spray booths, making the job an economical one from standpoint of time and cost. Clean spray booths also contribute to better working conditions, lessen waste and eliminate minor defects in spraying. We will be glad to demonstrate XCEM at your convenience, without obligation.

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have proved practicable. The general schedule given, however, is two, three or four coatings in view of the type of desired finish. Remembering that lacquers dry by the evaporation of the volatile solvent content, it is essential that this phase of application be not hastened, and that true assurance of thorough evaporation and dryness be given before the application of each succeeding coating. This schedule can be secured from the manufacturer of the product.

Recent demands have been for a lacquer that would deposit a film-forming medium comparable to a varnish, but having the drying time and general requirements of a lacquer. Recent developments have met with this demand in a true lacquer, and among the features claimed for such a product is the possible elimination of one previous operation.

Clear wood lacquers are usually shipped at a spraying consistency and represent among other features:

1—A finish indestructible, (or considered such through average usage).

2—Rapid drying.

3—Perfect leveling.

4—Ease of sprayability.

5—Richness of finish.

I have mentioned that from 2 to 4 coatings are entailed a finished operation; often times shading lacquers are cut in, and where this effect is desired in building a finish, it has been found most practicable to cut in on edges and high spots after the application of the first coating of lacquer. The object is that the succeeding coatings of clear wood lacquer will richen the under shading lacquer through its transparent film.

(Continued on page 99)

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Your finishing department will maintain a high standard of production—without delay or difficulties—in finishing your product in Brilliant Hilo Colored Baking Enamel—and the finish will match exactly batch after batch—no variance in color.

Assure yourself of these advantages during Summer sticky weather.

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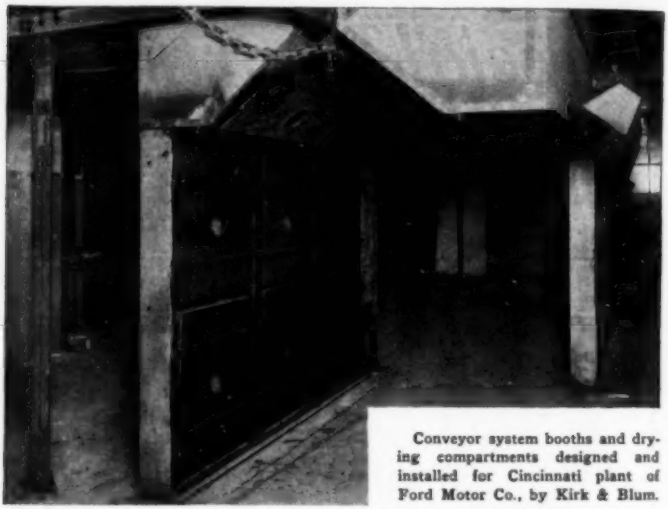

Conveyor system booths and drying compartments designed and installed for Cincinnati plant of Ford Motor Co., by Kirk & Blum.

Production Finishing Equipment

The application and drying of finishing materials are fast being placed on an efficient production basis through the employment of engineering principles. Kirk & Blum brings to the finishing branch of industry, scientifically designed and well manufactured equipment backed by ample facilities for rendering prompt service.

Typical Kirk & Blum equipment in the automotive industry covers booths, ovens, conveyors and ventilation, and similar systems adapted specifically to furniture and other industries. We also design and install special booths and handling equipment.

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"I hope this article will be of more than usual interest to finishing men since our company, odd though the fact may seem, manufactures both conveying machinery and metal beds. As the conveyor department is the largest end of the business, it can be appreciated that no pains were spared in working out a satisfactory and efficient solution of the material handling in our metal bed plant—with conveyors of our own manufacture. This same type of conveyor, with slight variations, can be used to advantage wherever articles of any nature are to be finished and baked."—

Cordially yours,
R. S. Logan
Vice-Pres.

FINISHING METAL BEDS ON A CONVEYOR LINE

Vice-president of the Logan Co. Inc.,* describes and illustrates the finishing room layout, equipment, methods and sequence of operations developed and used for some very particular quality-quantity production in metal finishing

By R. S. Logan

THE KEYNOTE in all industry today is the economical, continuous, forward movement of raw materials, assembled parts and finally the finished product—automatically. In the manufacture and finishing of metal beds, equipment is available, designed especially for this automatic forward movement of material in process and assembled units. The various operations are timed and sufficient operating space is allowed on the line to permit each operator to complete his part of the work.

From the accompanying layout the various conveyor lines may be seen. The assembly conveyor is a moving belt type, as illustrated in Fig. 1. Beds are assembled, welded, joint wiped, and smoothed along this line which ends at the metal-cleaning tanks. The belt conveyor at this point automatically discharges the beds onto a double-chain conveyor which immerses them in a hot chemical wash to remove grease, corrosion, etc.

Continuing on the same chain, the beds are brought up out of the chemical wash and immersed in a boiling water wash in tank No. 2. As they emerge from this tank to the end of the conveyor line (Fig. 2), they are removed from the conveyor by hand and dried with wiping rags, the drying being facilitated by rapid evaporation of the hot water. Notice in Fig. 2 the close proximity of the finishing conveyor line! After the bed

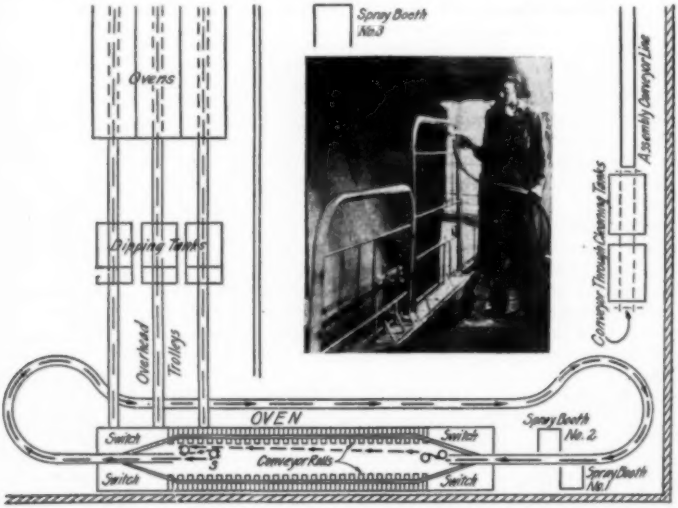
*Gravity and power conveyors, Louisville, Ky.

is thoroughly dried, it is placed on one of the specially constructed carriers on this line.

It might be added at this point, that these carriers are built in such a manner that, due to the spring holder at the base, the bed is held against the brace rod in a rigid vertical position, with a minimum of contact on the outside surface of the bed. The carriers are designed to hold beds of six different widths. Beds on the finishing line are carried forward at the rate of 9-f.p.m. to spray booth No. 1 (Fig. 3) where a heavy coat of enamel is applied on one side of the bed, and in spray booth No. 2 the other side of the bed is coated.

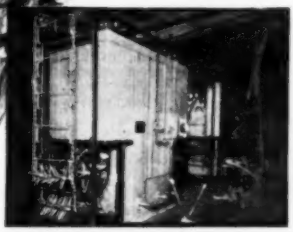
Referring to the layout, notice the relative positions of the two spray booths where operators may work continuously on both sides of beds without interfering with each other. The beds receive the oxidized spotting decoration over the wet enamel in these same booths, and then enter the oven where they remain 3½ hours at temperatures ranging from 180 to 200-deg. F. The oven mechanism will be described later. The beds leave the oven at the rate of one per minute and travel up to the packing and wrapping station where they are packed and wrapped, and taken either to cars or storage.

When the demand is heavy, the three dipping tanks shown on the layout are used. Beds are dipped and hung on hooks attached to an overhead trolley. After draining, the beds are placed in the ovens by means of the trolley and baked 3½ hours at 180 to 200-deg. F., and then brought out across the



Floor plan layout showing location and arrangement of finishing equipment and work stations. Insert view shows workman spraying one side of metal beds as they move slowly past the booth on a conveyor.

A GAP
that defies jumping



Inland Mfg. Co., Dayton, Ohio uses these Swartwout Ovens for burn-off and japanning processes on automobile steering-wheel spiders

Even the mountain goat, powerful leaper though he is, must sometimes meet the gap too wide to jump

Just as the nimble mountain goat turns back when the distance from crag to crag forbids a leap, so heat surrenders to confinement in Swartwout Metal Insulated Ovens because of the impassable Swartwout Stop-Gap Joint*.

Fabricated from an unusual and patented design, this unique joint breaks metal contact between inside and outside walls, as well as between panels. Where metal would conduct heat, thick layers of super-resistant insulating material have been substituted . . . . where heat would escape, a gap that defies jumping has been introduced.

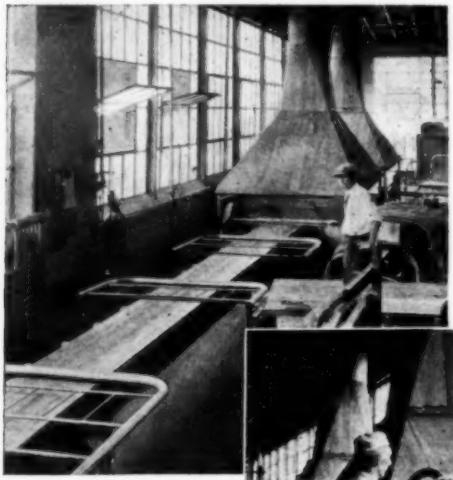
It is not essential that you be in the market today to ask for complete details on Swartwout Metal Insulated Ovens. An opportunity to make your acquaintance . . . . to explain the many Swartwout features . . . will most certainly be appreciated.

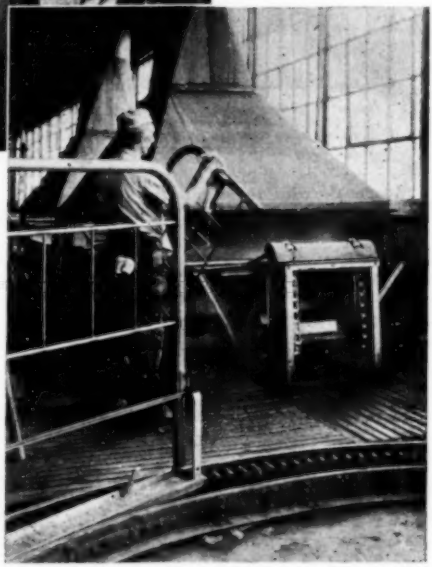
THE SWARTWOUT COMPANY, ***18511 Euclid Avenue, Cleveland, Ohio***

Swartwout Metal Insulated Ovens

Heat cannot jump the Swartwout Stop-Gap Joint

**There are imitations of the Swartwout Stop-Gap Joint, but only in Swartwout Metal Insulated Ovens will you find the genuine patented construction.*





Figs. 1 and 2—The view at left shows the assembly conveyor which leads to two hooded tanks —one containing chemical cleaner and the other hot water — into which the beds are immersed and then mechanically withdrawn at the discharge end, as shown in the lower view. A workman at this station wipes the surface and places the beds in upright position on the individual carriers which travel on the conveyor as shown.

dipping tanks and placed on the finishing conveyor line, where they proceed up to the packing and wrapping station. So far, I have described the finishing process on the less expensive type of metal beds.

The higher-priced beds follow through the cleaning tanks, and receive the ground coat or primer in spray booths No. 1 and No. 2, and are baked 3½ hours at 180-deg. F., after which they are taken to the spray booth pictured in Fig. 4, where the graining color is applied and followed by hand graining, as shown in Fig. 5. The grained beds are again placed on the finishing conveyor line and baked 3½ hours at 180-deg. F., followed by a clear lacquer coat applied in spray booth No. 3 (Fig. 6). This booth is also used for special finishes and refinishing.

After the lacquer spray, the beds are air dried; at this point they receive any special decoration that may be specified, such as ornamental panel work, decalcomania decoration, etc. The

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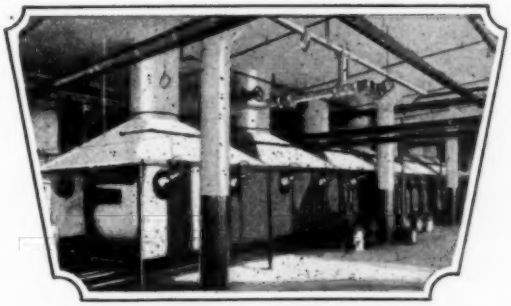

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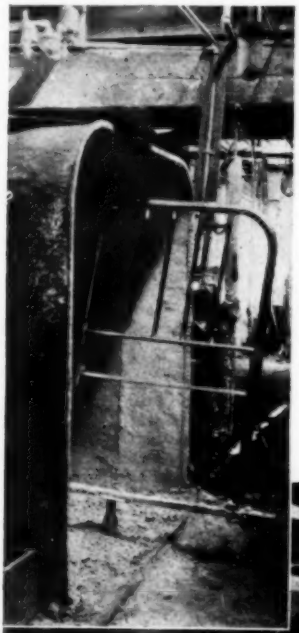
Fig. 6—Where the clear lacquer coat is put on over hand-grained surfaces to give the imitation wood grain a deep lustrous finish.



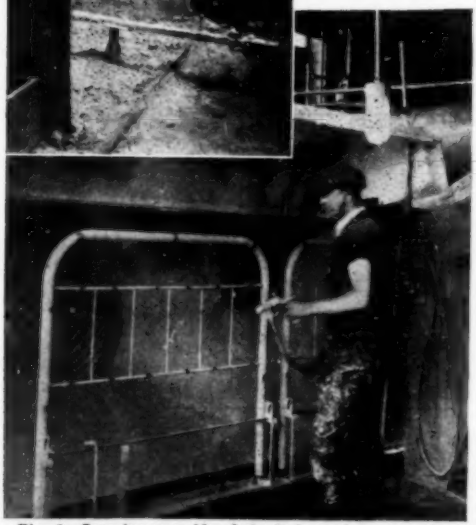


Fig. 3—Spraying one side of the beds as they move slowly past spray booth No. 1. The other side is sprayed at No. 2.

decorated portion receives a clear lacquer spray and is again air dried. The beds are then hand rubbed with pumice and water, followed by the Simonizing process, and are ready to be packed and shipped.

Before describing the oven, I might mention the refinishing department where a great number of used beds with marred finishes, (as sent in from public institutions, hospitals, etc.), are dipped into tanks containing solutions of boiling lye (Fig. 7) to remove the old finish, after which they are inspected. Those needing repairs or replacements are taken to the repair department and finally come through with the others, and they are either finished in spray booth No. 3 or, if the quantity justifies it, they are placed on the finishing line.

The patented oven mechanism is quite a feature of this conveyor line, in that the beds are turned automatically from a length position, as may be seen in many of the photographic views, to a side (or crosswise) position, as shown in Fig. 8, which was taken inside of the oven. The beds are carried into the infeed end of the oven in a length position (parallel to the direction of the chain) on the moving chain.

As they enter the oven, a patented mechanism turns the carrier with the bed mounted on it to a side position (at right angle to

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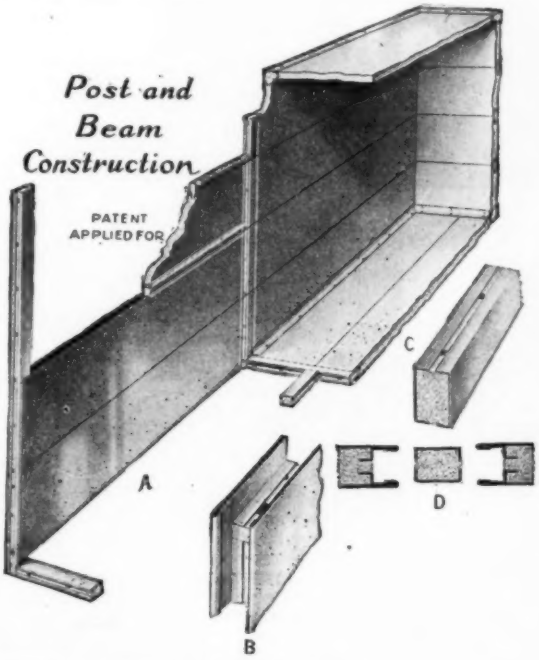

Cross section view of oven built with SadwithPanels.

A corner of a Sadwith Panel.

The Sadwith Post and Column showing metal and insulation.

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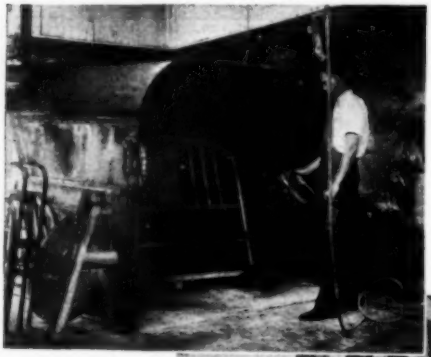

Fig. 4 (At top) —Spraying the graining color on beds of the higher priced class, which are to be grained in imitation of expensive cabinet woods.

Fig. 5 (Center) —Hand graining calls into play all the free-hand skill and artistry of an experienced workman.

direction of chain). The carrier, when completely turned, rests on conveyor rolls shown on both sides of the oven in the floor plan layout, and is automatically pushed along these rolls the entire length of the oven. The movement through the oven is extremely slow. As previously stated, the trip requires 3½ hours for each bed.

As the beds approach the turning mechanism at the outlet end of the oven, which is similar to that at the infeed end, they are again turned to a lengthwise position before actually leaving the oven. The moving chain follows through the oven. At the infeed end it runs between two sprockets one of which is offset to throw the direction of the chain to one side of the oven. Following this course it proceeds around a driving sprocket and back over a second take-up sprocket which is adjustable in a longitudinal direction, placing the chain back in the center of the oven at the outlet end, and in position to move the carriers forward.

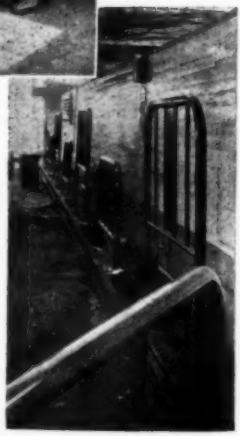

Fig. 10—A section of the conveyor line outside the oven.

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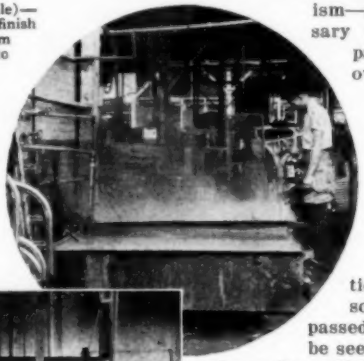

Fig. 7 (In circle)—Where the old finish is removed from metal furniture to be refinished—principally refinish jobs from public institutions.

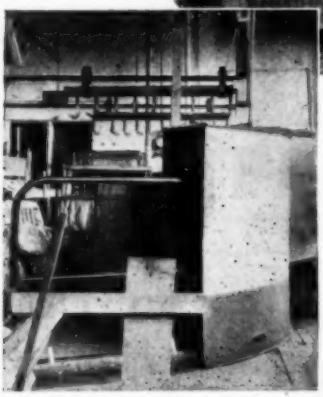

Fig. 9 (Below)—Outlet end of oven. Notice overhead conveyors.

ism—making it necessary for the beds to pass through the oven in a lengthwise position—an oven 750-ft. long would be required. The oven is equipped with metal spring doors at both ends, which automatically close as soon as the bed has passed the door, as may be seen in Fig. 9, which shows the outlet end of the oven with one of the metal doors open to allow a bed to pass out.

The double metal doors are so constructed that one door is always closed, thus preventing any direct draft through the oven. This aids materially in maintaining an even temperature inside the oven.

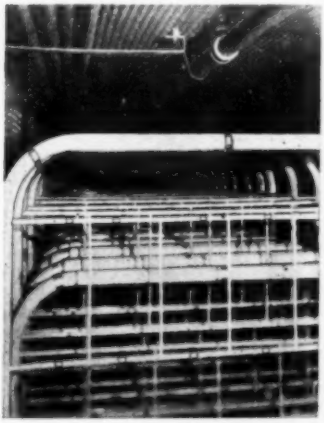

Fig. 8—View inside the oven where the head and foot ends of beds are positioned crosswise during the baking process, although they enter and leave by conveyors which move the carriers lengthwise as shown in Figs. 3 and 10.

It may be readily seen that there is a great saving in space, equipment, heat and ventilation effected by turning the beds from a lengthwise position to a crosswise position, and placing the bed on conveyor rolls. The speed of the conveyor chain is constant both inside and outside of the oven, and the number of carriers on this line determines the length of time the beds remains in the oven.

This conveyor line accommodates 150 carriers and the present oven is 95-ft. long. With the same number of carriers on this same line without the switching mechan-

Heat is thermostatically controlled in the oven, and recorded on the instrument mounted on the outside shown in Fig. 10.

A saving in handling costs of 75 percent, over old methods, is effected by this conveyor system, which also speeds up production so that the work is completed in about half the time previously required. To have handled the beds lengthwise through the oven would have required a building over 750-ft. long. Since the patented oven arrangement is but 95-ft. in length, the saving in floor space is evident.

High Baking Temperatures With Steam

In an article entitled, "Lacquer Primers for Metal," by S. P. Wilson (Feb. issue, page 41), the author made favorable mention of a composite system whereby the first coat on steel was a thin coat of long-oil clear varnish baked at 400-deg. F. for one hour, followed by a lacquer ground coat; and that the varnish thus baked at this high heat gives a suitable result in quick time; but he deplores the fact that ovens capable of reaching this temperature cannot be heated by steam, and that

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they require electric or gas-fired heating units.

It should be interesting, because not generally known, that it is now possible to obtain high baking temperatures with steam. One of the most important advances in recent years in the mechanics of drying and heating makes commercially practicable drying and baking temperatures up to 500-deg. F., with steam at pressures as high as 350-lbs. The same equipment can be used for lower temperatures, as for instance 150-deg. F., and lower at a direct pressure of only 125-lbs. as registered by the gauge. The advantages of this feature are self evident.

For the benefit of those who have not seen anything of this kind, a brief description may be welcome. The element that forms the basis of this heating unit is a seamless copper tube around which is wound a wide crimped-brass fin, by means of which the percentage of heating surface is multiplied to a considerable extent. The principle is the same as that employed for rapid radiating of heat *from* the cylinders of air-cooled engines.

Engineers claim that this surface is more effective than primary surface because, as they explain it, the scientifically determined spacing of the fins breaks the air into thin streams each in close contact with heat transmitting surface—and we know that copper affords a very high coefficient of heat conductivity. Because of this last-mentioned fact there is a remarkable difference between this heating element and iron pipe coils. From the standpoint of economy also, these copper tubes have merits. Being copper, they are free from corro-

sion; being seamless drawn, they afford a perfectly clear interior chamber and a heating wall of uniform thickness throughout, all of which means durability and practically limitless service.

Perhaps one other feature ought to be mentioned: Not only does this type of heating unit make possible such high temperatures with steam, but it also eliminates the necessity of installing reducing and safety valves where low temperatures are used and only high pressure steam is available.

I consider this the ultimate in steam-heated baking facilities to date, and perhaps the ideal type especially for the baking or force-hardening of lacquer-type coating. —E. Perry.

Identifying Pipe Lines by Color

Executives, engineers and those in charge of large industrial plants are beginning to realize the value of painting the pipe lines in their plants in different colors, so that one pipe line can be readily distinguished from another. This plan of identifying pipe lines is especially valuable when breaks in water or steam lines occur. Often such breaks send men scurrying about the plant attempting to trace a certain line in the excitement of the emergency when, if the different pipe lines were identified by suitable colors, considerable time and loss might be avoided. The coating of paint also makes the pipe lines more attractive, and protects their outside surfaces from rust.

While I believe there are no established colors for the different pipe lines, some efforts toward standardization have been made. The general practice seems to be the use of either a dark green or a

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brown color on cold water lines. This seems good practice, since light colors would soon discolor and become unsightly from sweating during hot summer weather.

On a recent visit to a modern, well-equipped plant, the following colors were observed on pipe lines throughout the buildings—and these seem to measure up to the general selection on colors for specific lines by those who have given the matter their attention:

Cold water lines and sprinkler systems were painted in green. Green does not discolor readily and it is probably the most satisfactory for cold water and sprinkler pipes. On the steam lines two colors were used: Silver and aluminum for the power and heating lines, and orange for the return or exhause pipe lines. The general practice seems to incline toward a light color on steam lines, and this holds true in plants where both the direct and return steam lines are in one color. Light colors are practical for this purpose, since they are applied to the asbestos pipe covering and not directly on to the metal pipe surface. All of the electrical conduits in this plant are black, which is the original factory finish.

In the plant I have in mind no gas lines are in use, but in factories where gas is used, some color such as red or blue would seem to be suitable. Where only three pipe lines are to be considered, it might be a good plan to stick to the three basic colors, using red for cold water lines, yellow for steam lines, and blue or the original black for electrical conduits. As new lines are added, orange, silver and other easily distinguished colors could be used. —A. J. Owen.

QUESTIONS AND ANSWERS

This service department is conducted to meet the reader's need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

White Dope-Resisting Paint

In the article, "Aircraft Finishing," January issue on page 29, Mr. Geo. A. Endom, the author, refers to a white dope-resisting paint. I am greatly interested in this and would like to have more information as to this product and the name of its manufacturer.—J. C. W.

Dope-resisting paint is manufactured by several concerns.* It comes in various colors, but I prefer white because it does not stain the fabric when dope is applied. I find the white dope-resisting paint that I use is always uniform and is the least troublesome of all such materials.

All dope-resisting paint should be thinned (when necessary) with naphtha or high-test gasoline. It should be applied by brush and should not take more than 30 minutes to dry when applied at normal room temperature. When the room is cold and damp, the paint may remain "tacky" for several hours, so care should be taken that surfaces are thoroughly dry and the room is warm, but without excess humidity. As a rule, the pigments in these paints have a tendency to settle very quickly, so stirring the paint before each application is absolutely necessary. The dope-resisting paint is applied at fairly heavy consistency, and one coat should suffice—provided there are no bare spots or "holidays" showing through that coat.—Geo. A. Endom.

* Manufacturers' names on request.

Bleached Walnut Finish

Under separate cover we are mailing you a small sample of bleached walnut finish, and will appreciate it if you can furnish us with information how to obtain this particular finish.—S. F. Co.

This bleached walnut finish can be produced as follows:

Be sure that all the walnut veneer is selected light clear walnut; by this I mean avoid using any walnut that has either a reddish or a bluish cast. Spray on one coat of high-grade bleaching lacquer; let this set four hours and then sand the surface.

Use natural filler prepared in the proportion of about 10-lbs. to 1½ gallons of benzine, adding about 20 percent white lead. Remember, white lead plays an important part in producing the desired color. To make this filler dry more rapidly, add a little japan dryer. Rub off the excess filler with sea grass or some other suitable material. The more open the pores, the heavier the filler should be used. Be sure to tow off crosswise of the wood, the same as when rubbing off any other filler.

The Blue Knight's Column

BUY in haste, repent in leisure". . . . . I endorse this quotation as being accurate to the *nth* degree and then some.

Some sales people go order daffy . . . . . they high pressure and press! They use mental crow-bars with which to pry the suspecting customer loose from his opinion of not being specially interested. When they do get accounts, each day they hold them is only one day closer to losing them!

. . . . ."*we have tried out some of your material in connection with our vacuum bottle jug and it has proved quite satisfactory. We are now in a position to go ahead with further quantity. . . . .*"

That's the way I do it . . . . . prove it by having the customer prove it for himself. You have to believe in quality of performance when you see it with your own eyes . . . . . you must believe in service when you are the one who actually receives it. 'Nuff said.

When you are ready to say you're from Missouri, whether you really are or are not, tell me. In the meantime, there are some research bulletins I can send you on some of the materials we already have produced for manufacturers. Write to the technical service department, please, and let us know if you are interested in any particular problem. Maybe my men have already solved it!

The Blue Knight

ROXALIN FLEXIBLE LACQUER COMPANY
103-9 SEVENTH AVENUE
LONG ISLAND CITY

Spray on one coat of white shellac cut in the proportion of two parts of shellac to one of alcohol. Let this dry five hours. Apply one coat of transparent varnish or lacquer. If this job is to be finished with lacquer, follow up with one or two more coats and rub with oil or water.

If the surface is to be finished with varnish, let the first coat of varnish dry 12 hours and then sand. Then apply one or two more coats, allowing adequate time for drying after each coat, of course. Follow with water or oil rubbing. Be sure that the lacquer or varnish is very clear, so that it will not color up the white filler. This, I think, will produce the particular finish wanted.

If there is any other wood, such as gum or birch used in connection with this walnut, you may obtain a "French light-tone water stain." Use this stain on the gum or birch to match up with the walnut. Use the same filler over this stain. The birch or gum must be very light in color to produce satisfactory results.

Whenever I have a job to be finished in walnut, and if it has birch or gum included with it, I always carry enough different kinds of stain in stock to make my own stains. In finishing custom jobs, if one had to buy stains for every job that came in, it would be rather expensive. Every foreman finisher should know what colors to buy so that he can produce practically any shade or tone he may need.—T. R. Nall.

Lacquer for Floors

In answer to the question, "Floor Finishing with Lacquer" in May issue, page 92, lacquer

may be used for this work, but it must be of high quality and at least three coats must be applied. If the floor is old, do not attempt to use varnish remover on it, but clean it with an electric cleaner. Then fill and proceed as with a new floor.

It is my opinion that an all-shellac finish is not satisfactory for a floor surface that is subjected to hard usage, as this material is likely to become too brittle for severe service. However, a product which has been on the market for some time, known as "waterproof mixing for shellac," gives it a tougher, harder surface and more body. When shellac is used on floors, I would suggest adding this mixing material in the right proportion.

Lacquer enamel can be used on a floor instead of linoleum. For this finish the floor is first given a coat of some good oil-base primer. It is then permitted to harden and the lacquer is applied either by brush or spray. Many attractive patterns can be made by spattering with another color or stenciling a border around the edge.—J. K. Cooper.

Airplane Propeller Finishing

We get propellers from the factory, finished in oil paints with one or more coats of varnish. It is necessary that we refinish them in lacquer to harmonize with the color scheme of the rest of the ship.

The method used at the present time is as follows:

The varnish is sanded off with naphtha and No. 240 sandpaper, cutting down to the color and sometimes past the color. Then one or more coats of pyroxylin surfacer is sprayed on, after which

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the surface is sanded smooth. The lacquer color is then applied in two or more coats, with a light sanding between coats.

The difficulty is that after an unreasonably short time the lacquer begins to flake off down to the wood. This is a perplexing problem to us, and we will certainly appreciate a personal and prompt reply from you.—C. A.

We have experimented with refinishing propellers after they have been finished with oil and have found it impractical. We find it is very difficult to finish with lacquer directly on the clear wood, as the lacquer is ordinarily so hard that it will break and flake off. We do, however, use lacquer which is of a grade that will penetrate deeply into the wood, and we think that this finish will be okey, but have not used it long enough to determine the life of the finish. Sorry that we cannot give you any better information at this time.—Ole Flottorp, (Flottorp Propeller Co., 1836 Linden Ave., S. E., Grand Rapids, Mich.)

As propeller manufacturers, we have no new ideas, as we have had trouble such as you mention. Metal is the only solution.—W. F. Crawford, (The Crawford Motor and Airplane Manufactory, Seal Beach, Calif.)

We know there have been a few instances where users of our propellers have endeavored to paint over the enamel which we use in finishing them and that lacquer has been found undesirable. In fact, a completely built-up coat of lacquer has proved undesirable as a propeller finish.

The best advice that we can

suggest is that the desired color be applied by ourselves (or the propeller manufacturer) rather than for the airplane company's finishers to attempt to do it.

We have four standard finishes —namely, black, blue, maroon and gray, plus clear varnish or natural wood finish, and if some other color is desired we could arrange to furnish it.—Hartzell Propeller Co. Piqua, Ohio.

The source of this trouble lies in the use of pyroxylin surfacer on wood; especially where the article in question is subject to severe vibration. Pyroxylin sanding surfacer is seldom satisfactory on aircraft—except when used judiciously on metal parts such as cowling, struts, etc. Therefore, I would suggest that instead of pyroxylin surfacer, a good oil-base primer be used directly over the varnished surface.

First dry sand the varnish. Next spray a light coat of oil-base primer that has been thinned to the ratio of three parts naphtha to one part primer. Dry overnight. Sand lightly and evenly and spray a "dust" coat of lacquer. By "dust" coat I mean spraying with high atomizing pressure and low fluid pressure, so that this coat is almost dry as soon as applied, preventing the solvents in the lacquer from "lifting" the oil-base undercoats.

The lacquer used in this coat should not be thinned—or if thinning is necessary (due to inadequate air pressure) use as little thinner or reducer as possible. When dry, sand with soapy water, wipe dry and clean; spray another coat of lacquer, reduced 50/50. A final mist coat can be applied if necessary.

I have always found this method

What Every Finishing Foreman Requires

Jamestown's No. 2798 Lacquer Primer

Pale in Color
Lays smooth
Does not lift
Sands easily
Dries quickly
Full body
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Jamestown Wood Finishing Co. products are guaranteed. If they will not do for you what we claim for them your money will be refunded.

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2300 Warren Ave. Chicago, Ill.

of finishing varnished wood surfaces very good, and while trouble is sometimes encountered by the oil-base undercoat "lifting," it will be due to careless workmanship or thoughtless application of lacquer coats.

I have seen several of the propellers finished by this firm, and would advise them to spray the lacquer a trifle less heavy. The film is too thick. This alone will cause flaking. Another item entering into their trouble might be the naphtha sanding. If the surface was not thoroughly clean—especially in the corners around the tip plate—the pyroxylin surfacer will always lift. I hope this will remedy the trouble.—George A. Endom.

Finishing End Grain

In June issue, page 61, under the above heading, M.V.L. says:

"Exposed ends of chair legs, table legs, etc., can be made to hold a good finish comparable to the sides, if a few coats of good shellac are wiped into the end surfaces with a pad, using a circular motion and rubbing till dry. This will glaze the ends so that the penetration of subsequent coats will be no greater here than on the sides. The number of coats of shellac to use will be governed by the porousness or density of the wood grain."

Rubbing shellac on to fill end-grain pores, and perhaps applying several coats in this way, and rubbing until dry, would be a costly way of finishing end grain.

Woods such as maple, birch, beech, gum and basswood, which are close-grained and which do not require to be filled with wood filler, can have the absorption checked by the use of shellac—but it should be applied with a brush, not with a pad. The pad has no advantage over the brush in any way; and there is considerable objection against its use.

One of the principal disadvantages is that one cannot use pure shellac with a pad. Even when used with oil, as in French polishing, the operator must be an expert to prevent the pad from sticking to the surface being polished. It is not practicable to use oil with shellac for sealing end wood, because of the long time required for the oil to dry; the oil acts as a retardant.

Birch veneer (if water stained) should always be filled with wood filler, the same as walnut or mahogany is filled, except that the filler for birch veneer may be used thinner than for the other woods. The reason for this is that this veneer is rotary-cut, and the pores in it are larger than in solid wood. If water stain is used, the effect is to open the pores still farther.

If a top is faced with birch veneer, and the edges of the top are not veneered, the end wood should be filled also, as this eliminates the necessity of sealing with shellac.

Curly birch, if finished natural, has considerable end wood on the face, but it does not need to be filled with paste filler if the following process is followed: First apply a coat of suitable pigmented surfacer. There are several satisfactory pigmented surfacers on the market that are quite transparent. Shellac will seal the cells of the wood and prevent absorption of the liquid in the subsequent coat of surfacer, and the pigment in the surfacer will fill the larger pores. When the surfacer is dry, sandpaper the surface and proceed with the other coats of finishing material.

The end grain of turned legs, etc., (when these parts are made of porous woods such as walnut

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Stick Shellac color card and booklet "How to Repair Varnished Surfaces" will be sent you free upon request.

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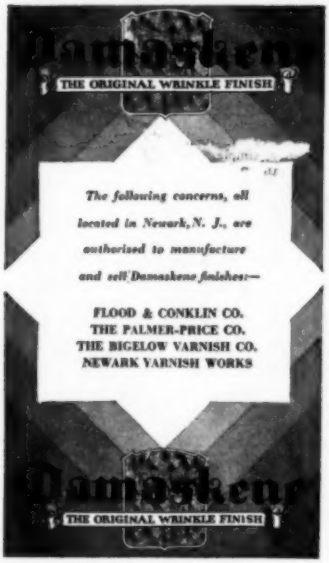
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FLOOD & CONKLIN CO.
THE PALMER-PRICE CO.
THE BIGELOW VARNISH CO.
NEWARK VARNISH WORKS
Damaskene
THE ORIGINAL WRINKLE FINISH

and mahogany) should be filled with paste filler and the filler should be brushed well into the pores. If this is done, there will be no need of an extra coat of shellac to seal the pores against absorption of subsequent coats of material.

End grain of turnings made of non-porous (close-grained) woods should be given a coat of heavy shellac applied with a brush. This end grain should be taken care of before the regular priming coat of shellac or surfacer is applied. When the shellac on the end grain is dry, sandpaper it and then coat the whole surface in the regular way. If the work is done in this way, the end wood will hold up the finish equally as well as the sides.—J. W. K.

Care of Spray Gun

In comment on the article of the above title appearing in May issue, page 65, I offer the following:

While spray guns are not "foolproof," if they are handled and cared for according to the manufacturer's directions their efficiency can be maintained over an unlimited period of time.

It is necessary to oil and grease all moving parts, not only where there are oil holes, but any place where there is any friction of moving parts.

After use, the gun still connected to the air hose, should be thoroughly cleaned with the solvent of the material that has been sprayed. When clean, cut the air pressure down to about 10-lbs. and hold the finger over the nozzle of the gun; at the same time pull the trigger gently until there is a "backfire" of air. This will force the thinner back through the

fluid parts. Remove and replace the finger several times, holding a constant pressure on the trigger. In this way the gun can be rinsed perfectly clean.

The fluid tip or nozzle should be cleaned with a pipe cleaner saturated with thinner. *Do not use sandpaper* on either the nozzle or the needle. These are the "money" parts of the gun and they wear out rapidly enough without adding to their wear by sanding.

When they are not in use, I always hang my spray guns in a cabinet, with the nozzles pointing down. I keep them loaded with any non-drying oil such as castor oil, cottonseed or lubricating oil. A spray gun can hang in this position for months and, if there should be any particles of pigment in the gun, the oil will keep them soft.

Before using the gun again, the oil must be flushed out with a solvent of the material to be used. If lacquer is to be sprayed, flushing with lacquer thinner is sufficient; but if paint, enamel or varnish is to be used, flush the gun first with thinner and then with turpentine. This will eliminate clogging, split spray and similar troubles.—H. L. Hill.

Wood Finishing

(Continued from page 64)

The above schedule refers to a clear finish. If a rubbed effect is desired, the last coating is given twice the drying time of any preceding lacquer coats, and rubbed under burlap with pumice stone, water, oil, etc. To eliminate the rubbing operation, a flat lacquer can be used as the last operation.

new!

Economy Deluxe Sprayer

For the user of industrial spray equipment this new *Economy DeLuxe Sprayer* gives better application of any paint, varnish or lacquer. Combines high efficiency operation and puts new life in the paint shop. Light in weight, does not clog, easily cleaned. There are many good reasons for the present popularity of Economy Spray Products

PRICED: *DeLuxe Spray Gun—with material tube, cover, container, 25 feet air hose and connections and agitator . . . $32.00. Above without agitator . . . $30.00. DeLuxe Gun without any of above accessories . . . $22.00. 25 feet air hose with connections . . $4.50. 1 quart metal container without cover . . . $2.50.*

. . . . . .

ECONOMY MACHINE PRODUCTS CO.,
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Chicago, Illinois.

Please ship me equipment listed on margin. Send complete specifications and data on other Economy Spray Equipment.

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Address .....
City .....State .....

This flat wood lacquer is usually built on the same basis as the clear wood lacquer to which is added flattening medium having the rubbed varnish effect which is so much desired.

Wood Lacquers, Colored

Color is used to a great extent about the home, and the present vogue calls for an unlimited variety of color and effects. Lacquer enamels find a big outlet in novelty furniture, breakfast sets and sun-room furniture.

The type of wood for these commodities, with the exception of wicker furniture, usually entails the softer varieties, and in the softer woods having more or less wider grain and depressions, the big problem is filling operations.

There are several finishing schedules. One that produces ideal results is as follows:

1—One coat sanding lacquer undercoater applied to stiffen wood fibers; lightly sanded.

2—One heavy coat of flat white sanding lacquer. This is built along certain lines in the hope of reaching a combination filler-first-coater, and after thorough drying it is sanded smooth, using dry sandpaper.

3—Two coats colored lacquer enamel to a finish. Often times clear wood lacquer is added to colored lacquer enamels to produce higher luster.

Crackle lacquers are employed to a certain extent. A schedule entailing this feature would include only one coating of solid color; after drying the crackle is applied and after crackle is formed and dried, it is sealed with a wash coating of clear wood lacquer.

New Materials and Equipment

Presenting briefly, certain outstanding features of new materials and improved equipment which have been developed for use in modern industrial finishing departments

Two New Model Spray Guns Announced

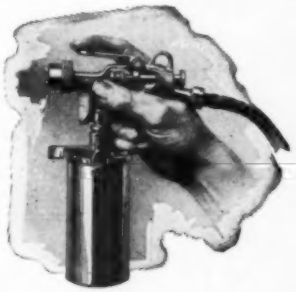
The Binks Mfg. Co., 3124 Carroll Ave., Chicago, announces the two new spray guns illustrated in this article and described as follows:

"The new No. 205 spray gun for general finishing purposes takes the place of the old Binks No. 105 model which was standard with the Binks company for over six years. The new gun is designed to produce a faultless spray with greater speed than before. New self-centering nozzles give a more

The No. 205 spray gun.

perfect spray coat and insure the even distribution of all paint solvents. The nozzle head of the new gun is so designed that it is self aligning. This safeguards against 'off-spray' and makes it possible for an inexperienced operator to produce satisfactory results.

"The other new gun created by the Binks company is the No. 245 touch-up and shading gun. The featured improvements of this accessory gun are in the nozzle head. Thus, as with the new No.



The No. 245 touch-up and shading gun.

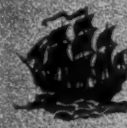
205 gun, more perfect atomization results, 'off-spray' is eliminated, and the perfection of the touch-up job does not depend on ability of the operator to adjust the nozzle head, as it adjusts itself."

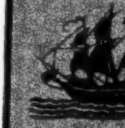
Descriptive bulletins on the new guns may be had on request.

New Pressure Tanks

Among the latest improvements and developments announced by

DECORATIVE EFFECTS!





Spot a National Decalcomania Transfer here and there, and note the improvement. To you, it means the difference between fast and slow turnover. National Transfers are adaptable to furniture, kitchen cabinets, radios, fixtures, toys, etc. Moderately priced and applied at low cost. Hundreds of designs to choose from, or special designs made to order. National Decals have been used for over 40 years.

Send for Catalog and Prices!

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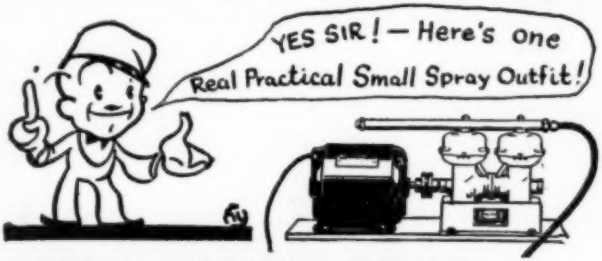

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COMPLETE OUTFIT
$57.00

Write for Descriptive Bulletin
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Crown Spray Gun Mfg. Co.
1218 Venice Blvd.
Los Angeles, Calif.

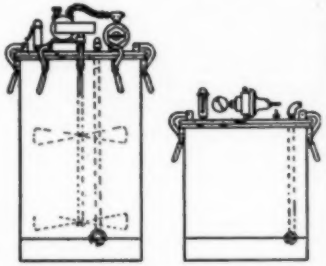
Thousands of these units are being used in small industrial shops, producing highly satisfactory finishes. Its wide range of sprays and ability to handle paints, lacquers, bronzes, enamels, varnishes, etc., make it a most profitable investment. Made of the best materials thruout and fully guaranteed.

IMPORTANT: The new No. 12 Crown Spray Gun is now ready. It's a great gun! When used in conjunction with the SPRA-MORE, it puts on a quality finish that rivals the highest priced equipment. Specify this gun when ordering your unit. The slight additional cost will certainly boost your profits.

the Paasche Airbrush Co., 1921 Diversey Parkway, Chicago, Ill., there is included a line of *clamp-tight cover pressure tanks* each fitted with an easily-adjusted and rapidly-operated full-size cover.

In the company's bulletin the following features are proclaimed:

"No nuts or bolts to tighten or wrenches necessary; only turn the lever over and the cover is on



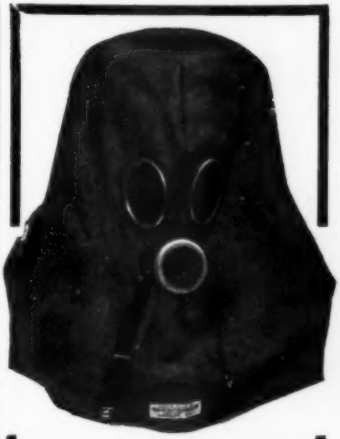
Two of the new tanks, the larger one being fitted with an airmotor-driven agitator.

or off quickly. Each clamp is adjustable with washer shims for proper tension, and once set it tightens uniformly. One-piece pressed-steel leaded tanks, easy to clean."

Tanks range in size from 6 to 60-gallon capacity, and agitators, either airmotor driven or hand driven, can be obtained from the Paasche Company, for use in these tanks.

Portable Rubbing and Polishing Machine

The Dugolite Products, Inc., (flexible-shaft grinding, polishing and buffing machines and supplies) 50 Church St., New York City, calls attention to a number of improvements and exclusive features in the latest Dugolite



Respirator Hoods

Respirator and Hood combined for Dust, Light Fumes and Paint Spraying.....especially recommended where head, face and neck covering—as well as breathing protection are required. In four styles: No. 34—***Dust Hood*** with sponge filter respirator. No. 35—with felt filter respirator. No. 36—***Acid-Resisting Cloth*** with sponge filter respirator. No. 37—with felt filter respirator.

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SAFETY EQUIPMENT CORP.
174 Johnson St. Brooklyn, N. Y.
Kindly send details of your respirator Hoods.
NAME .....
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For Dependable Finish
Auto Lacquers
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Of Superior Quality
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Have Stood the Test of Time
Nitro-Cellulose Solutions of all Kinds.
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Works Harrison, N. J.
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338-352 N. Kedzie Ave., Chicago

flexible shaft machines and attachments.

One of the models, wherein the motor is swivel mounted at the top of a three-caster stand, appears in the accompanying illustration. The circular pan at the base of this portable outfit serves as a convenient tray for extra discs or wheels for polishing, buffing, grinding and brushing.

The end of the shaft to which the tool is attached can be fitted with either an ordinary straight or

The column telescopes; minimum height 3-ft., maximum height 4-ft. on "D2" machine.

right-angle drive chuck. The right-angle drive is made of cast aluminum and its working parts are supported by four ball bearings. The handle can be placed in any position of the circle to suit the convenience of the operator. The handle shifts to either side as well as to any position. These right-angle drives give three speeds, namely 1750-r.p.m. (1 to 1), 3,500-r.p.m. (2 to 1), and 875-r.p.m. (½ to 1).

The Dugolite machine is made in different models to suit the needs of various types of shops. All attachments are detachable

and interchangeable; they will fit any model of Dugolite machine. This machine is supplied in either pedestal or overhead type.

Care of the Rubbing Machine

There are on the market to-day rubbing machines which, if they are properly cared for and used according to instructions, will give long service and do excellent work in the hands of experienced operators. The rubbing machine should be thoroughly cleaned and oiled after the day's work is completed; a high grade, thin machine oil should be used, such as "3-in-1" oil for instance. At least once each week the machine should be flushed with clean naphtha, wiped dry and oiled. This upkeep work helps wonderfully in keeping the machine in first class condition.

The cylinder head—the part that causes the pads to move back and forth—is usually the part of the mechanism to wear out first. It should be kept perfectly clean and well oiled to obtain the maximum amount of service.

When using the rubbing machine, the operator should be careful to avoid running over any edges, or permitting the moving parts to strike any obstructions, as this may not only mar the surface being rubbed, but it is liable to cause damage to the machine. —S. J. H.

Finishing Carvings

Carvings are usually only stained and coated with the finishing material to be used, such as shellac, varnish or lacquer. Owing to the their irregular surface they are rarely if ever filled; however, when filling is required, it is best applied with a spray gun, the surplus being brushed out with

Everything for the finishing shop

WE carry complete lines of quality paints, varnishes, lacquers, brushes and all tools used in a modern finishing shop. Our prices are surprisingly low for the quality of merchandise sold. Our prompt shipments will save you time.

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Each brush is put up in an individual box.

Width	Length Hair	Per Doz.	Each
3 inch	2¾ inch	$5.67	$ .55
3½ inch	3 inch	7.60	.75
4 inch	3¼ inch	10.80	1.05
4½ inch	3½ inch	15.00	1.50
5 inch	3¾ inch	17.40	1.70
6 inch	3¾ inch	25.67	2.55

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George E. Watson Co. "The Paint People"
164 W. Lake Street, Chicago

Please send me your new catalog on Painters' supplies

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Surely any first-class finisher is open to suggestions that pertain to his particular business.

You are constantly being bothered with the clouds of gritty dust, that are caused by the wearing away of your cement floors, falling on articles just finished.

You, no doubt, have been troubled with this condition all through your plant; if so, our suggestion to you is to apply a coat or two of FRENCH'S CEMENT FLOOR PAINT, and your troubles are at an end.

FRENCH'S CEMENT FLOOR PAINT is made in ten attractive shades, is easy to apply, water-proof and after being applied flows to an enamel-like finish and gives your floor that easy-to-keep-clean high lustre.

FRENCH'S CEMENT FLOOR PAINT not only stops dusting of the floors, but prevents dampness appearing on the same, and last but not least, stops disintegration which of course figures to a great extent in your building up-keep program.

FRENCH'S CEMENT FLOOR PAINT is a scientifically prepared paint developed and manufactured exclusively by Samuel H. French & Company, Philadelphia, Pa.

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ELECTRIC MIXERS

Clamp to *any* tank and mix *all* liquids. A wide variety of sizes and types up to 50,000 gallons capacity.

MIX QUICKER

LAST LONGER

COST LESS

PATENTED
The Features that insure the supremacy of "Hy-Speed" Mixers are fully covered by U. S. Patents

Write for Catalogue

•ALSOP•
ENGINEERING CO.•
47 West 63rd St., New York

a stubby brush and compressed air, using both at the same time. Cleaning off the filler this way before it sets or dries, will insure that the delicate lines remain clear and distinct.—M. V. L.

In today's competition, the road to the top is crowded.

Largest Radio Factory

The new unit at the Atwater Kent Mfg. Co.'s Philadelphia plant, recently dedicated, makes this not only the largest radio factory in the world, but one of the largest industrial institutions.

The new plant adds 16½ acres to the Atwater Kent factory. The original building, of which the new is an architectural duplicate, covers 15½ acres. A bridge thrown over the street between the old and new plants connects the two buildings and gives a combined floor space of 32 acres, or the equivalent of a small country estate.

Glidden Aviation Color Chart

The Glidden Co., (Aeronautical division), Cleveland, Ohio, has recently produced a new and attractive color card showing the standard shades in which it manufactures pigmented dope, semi-pigmented dope, flexible lacquer enamel, Speedenamel and Ripolin enamel for the aeronautical industry. This folder also carries a complete list of other aeronautical finishes developed in the Glidden laboratories, and lists methods of application for different finishes on the variety of aircraft surfaces.

This folder, spread out, measures 15 x 8½-in. and contains 24 color specimens of "Glidair" finishes.

Commercial Solvents' Catalog

The Commercial Solvents Corporation (chemical products), Terre Haute, Ind., has published a completely revised booklet containing the specifications, properties, and more important uses of its chemical products.

This booklet containing 36, 6x9-in. pages, is printed on coated paper with a heavy stock yellow cover. A copy can be obtained from either the Terre Haute or the New York Sales Office, the latter located at 230 Park Ave., New York City.

Invite us to show you

Sun Flat Lacquer

We will display our goods at our expense, and give you practical advice. How best to use.

White No. 1 Lacquer

COLORLESS

Clear and transparent, looks like a coat of celluloid on work. Can be polished.

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Industrial Finishing

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EDITORIAL

Equipment for Production Finishing

The finishing of one or two or three small articles by an individual can be taken care of with no more mechanical equipment than a container for the finishing material and a brush with which to spread it. But production finishing in a shop or factory is on a competitive basis—competitive not only in price but in quality of workmanship and speed of production—hence the employment of mechanical equipment for:

1—Cleaning, moving and handling articles to be finished;

2—Moving, handling, conditioning and applying finishing materials;

3—Sanding, rubbing and polishing surfaces being worked on;

4—Moving, conditioning and controlling the air to accelerate drying, and to ventilate and heat or cool the work rooms to make them comfortable and healthy for workmen; and for numerous other purposes relating directly or indirectly to the finishing purposes.

While quick-drying finishes have helped to make possible the speed with which modern finishing schedules are carried out, it is the employment of this mechanical equipment that makes possible large-scale production on a really satisfactory and economical basis.

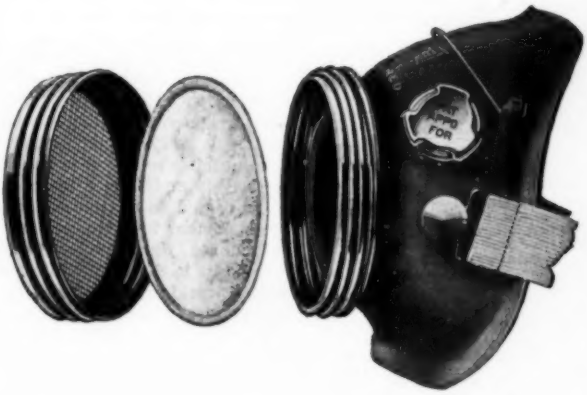
What equipment is employed, where it is placed in the department and how it is being used in the most modernly-equipped factories—information and suggestions in regard to this vitally important phase of industrial finishing is valuable and interesting to everyone responsible for production results in a finishing or refinishing department. Fortunately, INDUSTRIAL FINISHING magazine is now in position to supply in its editorial pages just such articles, many of which are specially prepared for INDUSTRIAL FINISHING by our own exclusive editorial representative.

Airplane Finishing

Some of the most intricate and particular finishing problems occur in the manufacture and maintenance of modern aircraft. Here are presented parts made of metal, wood and fabrics—all of them subjected to outside exposure in all kinds of weather and climatic conditions. All are called upon to withstand the severest kinds of strain, stresses and vibration.

Consider the steel tubing in fuselage framing and landing gears,

BREATHE PURE AIR



The Willson Dustite Respirator

For Dust and Spray

Clean air . . . air filtered by the Willson respirator . . . keeps those delicate organisms of mouth-nose-throat—and lungs in a healthier condition.

You'll have more "pep" and a better appetite at the end of a day when you have worn a Willson Dustite.

Sent by return mail upon receipt of $2.25 (special prices on dozen lots).

Willson Products, Inc.

Reading, Pa.

IT'S FOOL PROOF!

The New Improved

"JIFFY STRIPER"

Makes Striping a Pleasure

It's a tool anyone can use—you, yourself, can turn out a PERFECT STRIPING JOB with just a little practice. The Jiffy Striper is used and endorsed by leading Artists and Painters of Flint, Mich.

Can be used with Duco or Lacquer—makes every sort of stripe from finest to a stripe ½-inch wide.

Costs only $10.00, Complete

Ask your supply dealer to furnish; if not, send your order and check today to:

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Importers and Manufacturers

Bronze Powders
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We specialize in spray bronzes and striping bronzes for Industrial Work

Samples and prices submitted upon request

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the large areas of thin sheet metal in fuselage and wings of all-metal ships, the fabric covering of wings; also the plywood, wooden ribs, spars and instrument boards and the propellers of wood or metal, as well as numerous other parts. All these must have the ultimate in surface protection with the minimum of weight added.

Remarkable progress has been made in the development of suitable finishes especially designed for these various parts, but the information about how to use them effectively and economically must be imparted to a greater number of workmen, foremen and superintendents who are responsible for results in the original finishing, repair finishing and refinishing departments.

INDUSTRIAL FINISHING magazine is the logical medium through which those in the aircraft industry can exchange ideas, ask questions, offer suggestions and submit the results of their airplane finishing experiences. A number of the best informed aircraft finishers are included in INDUSTRIAL FINISHING'S staff of writers, and in addition to the articles they write, their knowledge and experience are available for servicing problems and questions sent in by the readers of this publication. Remember, INDUSTRIAL FINISHING magazine is all its name implies and more; its editorial contents includes a continual variety of articles on all kinds of wood finishing, metal finishing, fabric finishing and refinishing for both protective and decorative purposes.

A new and unusual finish should create a sensation on its announcement—a welcome fitting to color's importance in industry.